

FCC LTE REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
October 07, 2019

Address:
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Location:
HCT CO., LTD.,
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Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
Report No.: HCT-RF-1909-FC021-R1

FCC ID: A3LSMW767U

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model(s): SM-W767V, SM-W767P, SM-W767A, SM-W767W, SM-W767U
 EUT Type: Note PC
 FCC Classification: PCS Licensed Transmitter (PCB)
 FCC Rule Part(s): §90, §22, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
LTE – Band26 (1.4)	814.7 – 823.3	1M09G7D	QPSK	0.267	24.26
		1M09W7D	16QAM	0.224	23.51
		1M09W7D	64QAM	0.176	22.45
LTE – Band26 (3)	815.5 – 822.5	2M71G7D	QPSK	0.263	24.20
		2M70W7D	16QAM	0.223	23.48
		2M70W7D	64QAM	0.177	22.49
LTE – Band26 (5)	816.5 – 821.5	4M52G7D	QPSK	0.271	24.32
		4M49W7D	16QAM	0.214	23.29
		4M51W7D	64QAM	0.183	22.62
LTE – Band26 (10)	819.0	8M94G7D	QPSK	0.247	23.93
		8M97W7D	16QAM	0.211	23.25
		8M98W7D	64QAM	0.167	22.22
LTE – Band26 (15)	821.5	13M4G7D	QPSK	0.259	24.13
		13M4W7D	16QAM	0.215	23.32
		13M4W7D	64QAM	0.167	22.22

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C.853(a)



Report prepared by : Kwon Jeong
Engineer of Telecommunication Testing Center



Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1909-FC021	September 30, 2019	- First Approval Report
HCT-RF-1909-FC021-R1	October 07, 2019	- Removed the Ant+ on page 5.

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.(HCT Accreditation No.: KT197)

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMW767U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§90, §22, §2
EUT Type:	Note PC
Model(s):	SM-W767V, SM-W767P, SM-W767A, SM-W767W, SM-W767U
Tx Frequency:	814.7 MHz – 823.3 MHz (LTE – Band 26 (1.4 MHz)) 815.5 MHz – 822.5 MHz (LTE – Band 26 (3 MHz)) 816.5 MHz – 821.5 MHz (LTE – Band 26 (5 MHz)) 819.0 MHz (LTE – Band 26 (10 MHz)) 821.5 MHz (LTE – Band 26 (15 MHz))
Date(s) of Tests:	August 30, 2019 ~ September 25, 2019

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Note PC with UMTS and LTE.

It also supports IEEE 802.11 a/b/g/n/ac (HT20/40/80), Bluetooth, BT LE.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Channel Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 CONDUCTED OUTPUT POWER

Test Overview

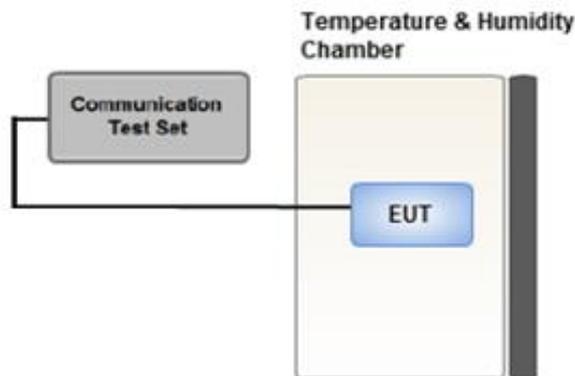
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base station emulator, communications test set, call box, or similar instrumentation that is capable of establishing a communications link with the EUT to enable control over variable parameters (e.g., output power, OBW, etc.).

In some cases, these instruments also include basic digital spectrum analyzer and/or power meter capabilities that can be utilized to measure the RF output power if the specified detectors and requirements can be realized and the measurement functions have been calibrated.

Test Procedure

1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
2. Conducted average power was measured using a calibrated Radio Communication Tester.

Test setup



3.3 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-E-2016 Clause 2.2.17.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $>$ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The power is calculated by the following formula;

$$P_{d(dBm)} = P_{g(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration
4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

3.4 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $> 2 \times$ span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10th harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
3. For spurious emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The spurious emissions is calculated by the following formula;

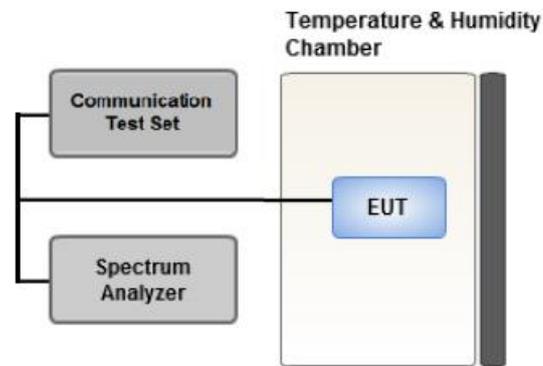
$$\text{Result}_{(\text{dBm})} = P_{g(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

Where: P_g is the generator output power into the substitution antenna.

If the fundalmatal frequency is below 1GHz, RF output power has been converted to EIRP.

$$\text{EIRP}_{(\text{dBm})} = \text{ERP}_{(\text{dBm})} + 2.15$$

3.5 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

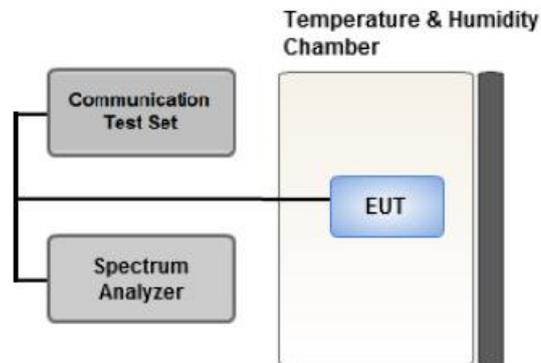
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW \geq 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

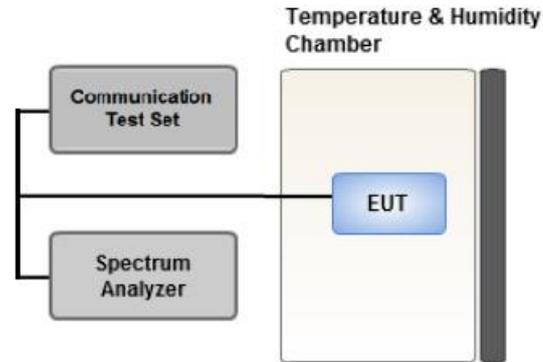
Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

1. RBW = 1 MHz
2. VBW \geq 3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep \geq 2 x Span / RBW

3.7 CHANNEL EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

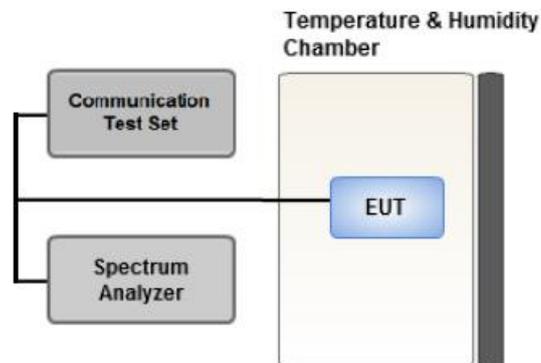
Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW :
 - .- EA licensee's frequency block by up to and including 37.5 kHz : 300Hz
 - .- EA licensee's frequency block greater than 37.5 kHz : 100kHz
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

For 90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed.

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

2. Primary Supply Voltage:

- Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.
- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.9 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- All modes of operation were tested and the worst case results are reported.
- Please refer to the table below.

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	QPSK,	1	0	X
	16QAM,			
	64QAM			
Radiated Spurious and Harmonic Emissions	QPSK	1	0	X

3.10 WORST CASE(CONDUCTED TEST)

Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM	1.4, 3, 5	High	Full RB	0
	QPSK, 16QAM, 64QAM	10, 15	Mid	Full RB	0
Channel Edge	QPSK	1.4	Low	1	0
			High	1	5
		3	Low	1	0
			High	1	14
		5	Low	1	0
			High	1	24
		10	Mid	1	0
				1	49
		15	Mid	1	0
				1	74
1.4, 3, 5	Low, High	Full RB	0		
10, 15	Mid	Full RB	0		
Band Edge (Staddle Channel)	QPSK	1.4	Mid	1	5
		3	Mid	1	14
		5	Mid	1	24
		10	Mid	1	49
		15	Mid	1	74
		1.4, 3, 5, 10, 15	Mid	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5	Low, High	1	0
		10, 15	Mid	1	0

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibrati on Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	06/10/2019	Annual	06/10/2020
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	06/10/2019	Annual	06/10/2020
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	05/03/2019	Annual	05/03/2020
Agilent	E3632A/DC Power Supply	MY40004326	07/01/2019	Annual	07/01/2020
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93000717	08/14/2019	Annual	08/14/2020
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	10/04/2018	Annual	10/04/2019
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	01/28/2019	Biennial	01/28/2021
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	05/08/2019	Annual	05/08/2020
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2019	Annual	06/04/2020
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/22/2018	Annual	10/22/2019
Agilent	8960 (E5515C)/ Base Station	MY48360800	09/27/2018	Annual	09/27/2019
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	08/23/2018	Biennial	08/23/2020
Schwarzbeck	VULB9160/ Bilog Antenna	9160-3368	08/09/2018	Biennial	08/09/2020
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6201502997	08/09/2019	Annual	08/09/2020
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/30/2019	Annual	01/30/2020
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/15/2019	Annual	07/15/2020
REOHDE & SCHWARZ	ESU40 / EMI TEST RECEIVER	100524	05/17/2019	Annual	05/17/2020
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (\pm dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Channel Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §90.691	< 50 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5 kHz of Block Edge	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §22.917(a)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046 §90.635	< 100 Watts	PASS
Frequency stability / variation of ambient temperature	§2.1055, §90.213 §22.355	< 2.5 ppm	PASS

Note:

1. The same samples were used for SAR and EMC

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§22.913(a)(5)	< 7 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §90.691 §22.917(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	0.483	26.84

ERP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test , the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test , the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

16QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

64QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA

8.1 CONDUCTED OUTPUT POWER

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				814.7MHz		823.3MHz		
				dBm	W	dBm	W	
1.4	QPSK	1	0	23.70	0.234	23.97	0.250	100
		1	3	23.81	0.240	24.20	0.263	100
		1	5	23.75	0.237	24.14	0.259	100
		3	0	23.77	0.238	24.08	0.256	100
		3	1	23.81	0.240	24.26	0.267	100
		3	3	23.77	0.238	23.99	0.251	100
		6	0	22.85	0.193	23.22	0.210	100
	16QAM	1	0	23.00	0.200	23.32	0.215	100
		1	3	23.05	0.202	23.27	0.212	100
		1	5	23.02	0.200	23.51	0.224	100
		3	0	22.78	0.190	23.10	0.204	100
		3	1	22.82	0.191	23.09	0.204	100
		3	3	22.87	0.194	23.13	0.206	100
		6	0	21.91	0.155	22.37	0.173	100
	64QAM	1	0	22.05	0.160	22.30	0.170	100
		1	3	22.04	0.160	22.45	0.176	100
		1	5	21.99	0.158	22.24	0.167	100
		3	0	21.95	0.157	22.27	0.169	100
		3	1	21.98	0.158	22.18	0.165	100
		3	3	21.99	0.158	22.28	0.169	100
		6	0	20.83	0.121	21.05	0.127	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				815.5MHz		822.5MHz		
				dBm	W	dBm	W	
3	QPSK	1	0	23.75	0.237	24.01	0.252	100
		1	7	23.77	0.238	24.20	0.263	100
		1	14	23.74	0.237	24.19	0.262	100
		8	0	22.84	0.192	23.07	0.203	100
		8	3	22.93	0.196	23.26	0.212	100
		8	7	22.86	0.193	23.30	0.214	100
		15	0	22.92	0.196	23.14	0.206	100
	16QAM	1	0	22.97	0.198	23.42	0.220	100
		1	7	23.07	0.203	23.48	0.223	100
		1	14	23.02	0.200	23.38	0.218	100
		8	0	21.91	0.155	22.37	0.173	100
		8	3	22.02	0.159	22.36	0.172	100
		8	7	21.89	0.155	22.25	0.168	100
		15	0	21.91	0.155	22.40	0.174	100
	64QAM	1	0	21.95	0.157	22.28	0.169	100
		1	7	21.99	0.158	22.49	0.177	100
		1	14	21.98	0.158	22.45	0.176	100
		8	0	20.97	0.125	21.31	0.135	100
		8	3	20.91	0.123	21.26	0.134	100
		8	7	20.92	0.124	21.34	0.136	100
		15	0	20.90	0.123	21.14	0.130	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)				Limit (W)
				816.5MHz		821.5MHz		
				dBm	W	dBm	W	
5	QPSK	1	0	23.68	0.233	24.07	0.255	100
		1	12	23.88	0.244	24.32	0.271	100
		1	24	23.85	0.243	24.30	0.269	100
		12	0	22.85	0.193	23.14	0.206	100
		12	6	22.95	0.197	23.19	0.208	100
		12	11	22.92	0.196	23.40	0.219	100
		25	0	22.93	0.196	23.43	0.220	100
	16QAM	1	0	22.92	0.196	23.14	0.206	100
		1	12	23.07	0.203	23.29	0.213	100
		1	24	23.06	0.202	23.29	0.214	100
		12	0	21.98	0.158	22.39	0.174	100
		12	6	21.97	0.157	22.22	0.167	100
		12	11	21.88	0.154	22.10	0.162	100
		25	0	21.94	0.156	22.25	0.168	100
	64QAM	1	0	21.98	0.158	22.25	0.168	100
		1	12	22.13	0.163	22.62	0.183	100
		1	24	21.96	0.157	22.22	0.167	100
		12	0	21.01	0.126	21.21	0.132	100
		12	6	21.00	0.126	21.38	0.137	100
		12	11	20.97	0.125	21.37	0.137	100
		25	0	20.92	0.124	21.35	0.136	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				819MHz		
				dBm	W	
10	QPSK	1	0	23.85	0.243	100
		1	24	23.93	0.247	100
		1	49	23.88	0.244	100
		25	0	22.98	0.199	100
		25	12	23.00	0.200	100
		25	24	22.99	0.199	100
		50	0	23.00	0.200	100
	16QAM	1	0	23.09	0.204	100
		1	24	23.07	0.203	100
		1	49	23.25	0.211	100
		25	0	21.95	0.157	100
		25	12	22.01	0.159	100
		25	24	21.96	0.157	100
		50	0	21.97	0.157	100
	64QAM	1	0	22.12	0.163	100
		1	24	22.12	0.163	100
		1	49	22.22	0.167	100
		25	0	21.03	0.127	100
		25	12	21.01	0.126	100
		25	24	20.97	0.125	100
		50	0	20.96	0.125	100

Band Width	Modulation	RB Size	RB Offset	Max. output power(dBm)		Limit (W)
				821.5MHz		
				dBm	W	
15	QPSK	1	0	24.13	0.259	100
		1	36	23.99	0.251	100
		1	74	23.95	0.248	100
		36	0	23.02	0.200	100
		36	18	23.09	0.204	100
		36	39	23.13	0.206	100
		75	0	23.09	0.204	100
	16QAM	1	0	23.32	0.215	100
		1	36	23.20	0.209	100
		1	74	23.24	0.211	100
		36	0	21.95	0.157	100
		36	18	22.11	0.163	100
		36	39	22.14	0.164	100
		75	0	22.08	0.161	100
	64QAM	1	0	22.20	0.166	100
		1	36	22.12	0.163	100
		1	74	22.22	0.167	100
		36	0	21.04	0.127	100
		36	18	21.15	0.130	100
		36	39	21.17	0.131	100
		75	0	21.05	0.127	100

8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
814.7	LTE B26/ 1.4 MHz	QPSK	-35.86	27.69	-10.29	1.27	V	< 100	0.041	16.13
		16QAM	-36.53	27.02	-10.29	1.27	V		0.035	15.46
		64QAM	-38.34	25.21	-10.29	1.27	V		0.023	13.65
823.3		QPSK	-35.44	28.17	-10.25	1.28	V		0.046	16.64
		16QAM	-36.16	27.45	-10.25	1.28	V		0.039	15.92
		64QAM	-37.84	25.77	-10.25	1.28	V		0.027	14.24

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
815.5	LTE B26/ 3 MHz	QPSK	-35.83	27.72	-10.29	1.27	V	< 100	0.041	16.16
		16QAM	-36.67	26.88	-10.29	1.27	V		0.034	15.32
		64QAM	-37.66	25.89	-10.29	1.27	V		0.027	14.33
822.5		QPSK	-35.35	28.22	-10.26	1.28	V		0.047	16.68
		16QAM	-36.10	27.47	-10.26	1.28	V		0.039	15.93
		64QAM	-37.59	25.98	-10.26	1.28	V		0.028	14.44

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
816.5	LTE B26/ 5 MHz	QPSK	-35.84	27.73	-10.28	1.27	V	< 100	0.041	16.18
		16QAM	-36.66	26.91	-10.28	1.27	V		0.034	15.36
		64QAM	-37.69	25.88	-10.28	1.27	V		0.027	14.33
821.5		QPSK	-35.35	28.18	-10.26	1.28	V		0.046	16.64
		16QAM	-36.10	27.43	-10.26	1.28	V		0.039	15.89
		64QAM	-37.28	26.25	-10.26	1.28	V		0.030	14.71

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
819.0	LTE B26/ 10 MHz	QPSK	-35.73	27.80	-10.27	1.27	V	< 100	0.042	16.26
		16QAM	-36.37	27.16	-10.27	1.27	V		0.036	15.62
		64QAM	-38.33	25.20	-10.27	1.27	V		0.023	13.66

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
821.5	LTE B26/ 15 MHz	QPSK	-35.75	27.78	-10.26	1.28	V	< 7.00	0.042	16.24
		16QAM	-36.53	27.00	-10.26	1.28	V		0.035	15.46
		64QAM	-38.79	24.74	-10.26	1.28	V		0.021	13.20

Note

1. Limit: None (for reporting purposes only).

8.3 RADIATED SPURIOUS EMISSIONS

- ▣ OPERATING FREQUENCY: 823.3 MHz
- ▣ MEASURED OUTPUT POWER: 18.79 dBm = 0.076 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 1.4 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.79 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26697 (814.7)	1,629.40	-52.86	9.40	-63.45	1.82	H	-55.87	74.66
	2,444.10	-54.74	10.47	-59.54	2.27	H	-51.35	70.13
	3,258.80	-55.80	12.00	-57.31	2.66	H	-47.97	66.76
26783 (823.3)	1,646.60	-52.01	9.48	-62.71	1.83	H	-55.06	73.85
	2,469.90	-54.15	10.60	-59.19	2.28	H	-50.87	69.66
	3,293.20	-56.50	12.20	-58.21	2.69	V	-48.70	67.49

- ▣ OPERATING FREQUENCY: 822.5 MHz
- ▣ MEASURED OUTPUT POWER: 18.83 dBm = 0.076 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 3 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10} (W) =$ 31.83 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26705 (815.5)	1,631.00	-52.94	9.40	-63.53	1.82	H	-55.95	74.79
	2,446.50	-54.36	10.47	-59.16	2.27	H	-50.97	69.80
	3,262.00	-56.86	12.00	-58.37	2.66	V	-49.03	67.87
26775 (822.5)	1,645.00	-51.22	9.48	-61.92	1.83	V	-54.27	73.11
	2,467.50	-54.58	10.60	-59.62	2.28	V	-51.30	70.13
	3,290.00	-57.17	12.20	-58.88	2.69	V	-49.37	68.20

- ▣ OPERATING FREQUENCY: 821.50 MHz
- ▣ MEASURED OUTPUT POWER: 18.79 dBm = 0.076 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 5 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10} (W) =$ 31.79 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26715 (816.5)	1,633.00	-52.86	9.40	-63.45	1.82	V	-55.87	74.66
	2,449.50	-54.41	10.53	-59.37	2.27	V	-51.11	69.90
	3,266.00	-57.26	12.05	-58.73	2.67	H	-49.34	68.14
26765 (821.5)	1,643.00	-52.23	9.45	-62.85	1.83	H	-55.23	74.02
	2,464.50	-54.46	10.58	-59.34	2.28	V	-51.04	69.83
	3,286.00	-57.61	12.15	-59.41	2.69	H	-49.95	68.74

- ▣ OPERATING FREQUENCY: 819.00 MHz
- ▣ MEASURED OUTPUT POWER: 18.41 dBm = 0.069 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 10 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.41 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26740 (819.0)	1638.00	-51.59	9.45	-62.21	1.83	V	-54.59	73.00
	2457.00	-54.42	10.55	-59.13	2.27	H	-50.85	69.27
	3276.00	-57.16	12.10	-58.82	2.68	V	-49.40	67.81

- ▣ OPERATING FREQUENCY: 821.50 MHz
- ▣ MEASURED OUTPUT POWER: 18.39 dBm = 0.069 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 15 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.39 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26765 (821.5)	1643.00	-52.54	9.45	-63.16	1.83	H	-55.54	73.93
	2464.50	-54.43	10.58	-59.31	2.28	H	-51.01	69.40
	3286.00	-57.09	12.15	-58.89	2.69	H	-49.43	67.82

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Band 26	1.4 MHz	823.3	QPSK	6	0	1.0898
			16QAM			1.0903
			64QAM			1.0916
	3 MHz	822.5	QPSK	15		2.7098
			16QAM			2.6979
			64QAM			2.7029
	5 MHz	821.5	QPSK	25		4.5167
			16QAM			4.4876
			64QAM			4.5069
	10 MHz	819.0	QPSK	50		8.9365
			16QAM			8.9668
			64QAM			8.9815
	15 MHz	821.5	QPSK	75		13.440
			16QAM			13.426
			64QAM			13.408

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 45 ~ 59.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	814.7	3.6875	27.976	-67.365	-39.389	-13.00
		823.3	3.6890	27.976	-67.439	-39.463	
	3	815.5	3.1850	27.976	-67.234	-39.258	
		822.5	3.7015	27.976	-67.086	-39.110	
	5	816.5	3.7020	27.976	-67.086	-39.110	
		821.5	3.6915	27.976	-67.335	-39.359	
	10	819.0	3.7054	27.976	-67.090	-39.114	
	15	821.5	3.6950	27.976	-66.989	-39.013	

Note:

1. Plots of the EUT’s Conducted Spurious Emissions are shown Page 80 ~ 87.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor(dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20	30.131

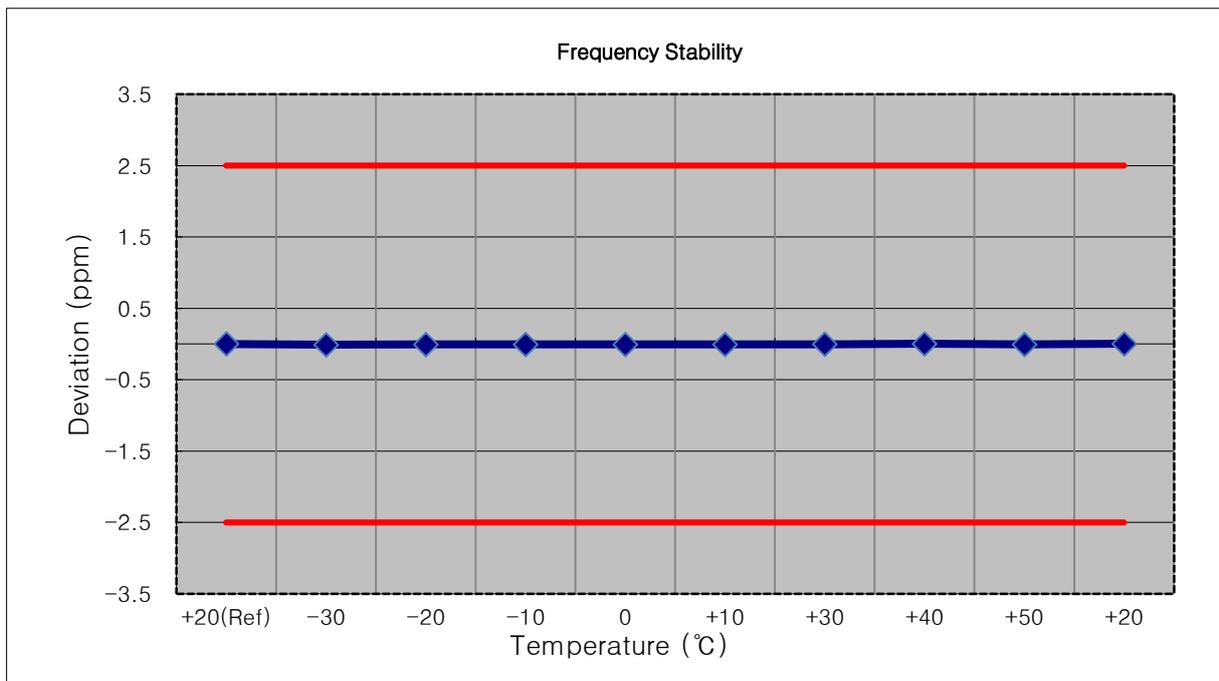
8.6 CHANNEL EDGE

- Plots of the EUT’s Band Edge are shown Page 60 ~ 79.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

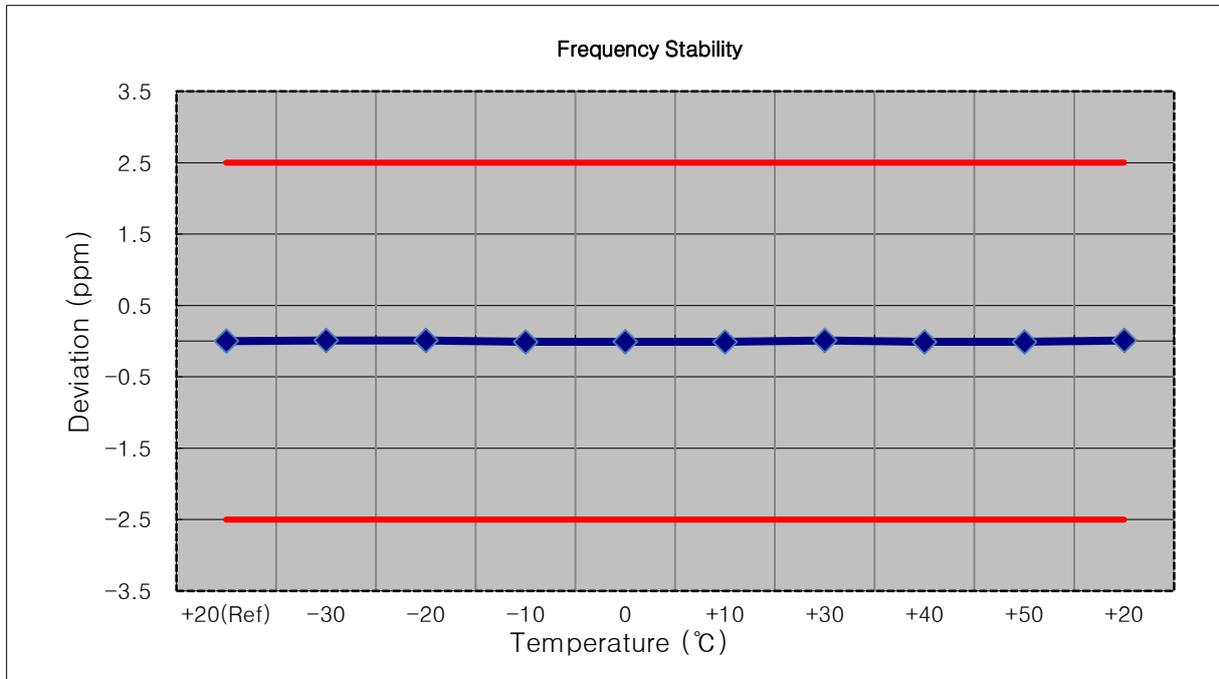
- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 814,700,000 Hz
- ▣ CHANNEL: 26697(1.4 MHz)
- ▣ REFERENCE VOLTAGE: 7.70 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	7.700	+20(Ref)	813 699 992	0.0	0.000 000	0.000
100%		-30	813 699 984	-7.5	-0.000 001	-0.009
100%		-20	813 699 986	-5.3	-0.000 001	-0.007
100%		-10	813 699 987	-5.0	-0.000 001	-0.006
100%		0	813 699 987	-4.7	-0.000 001	-0.006
100%		+10	813 699 987	-4.4	-0.000 001	-0.005
100%		+30	813 699 989	-2.9	0.000 000	-0.004
100%		+40	813 699 995	3.0	0.000 000	0.004
100%		+50	813 699 987	-4.7	-0.000 001	-0.006
Batt. Endpoint		7.300	+20	813 699 995	3.5	0.000 000



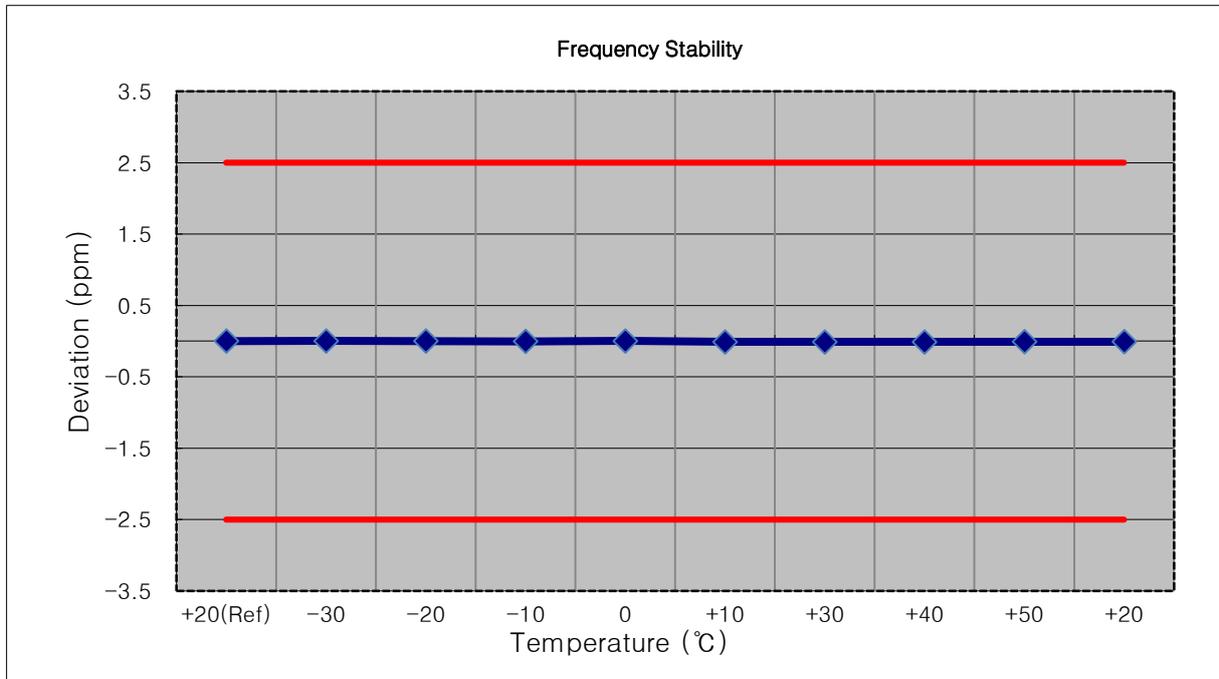
- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 815,500,000 Hz
- ▣ CHANNEL: 26705(3 MHz)
- ▣ REFERENCE VOLTAGE: 7.70 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	7.700	+20(Ref)	815 500 008	0.0	0.000 000	0.000
100%		-30	815 500 016	8.1	0.000 001	0.010
100%		-20	815 500 016	7.4	0.000 001	0.009
100%		-10	815 500 000	-8.1	-0.000 001	-0.010
100%		0	815 500 001	-7.3	-0.000 001	-0.009
100%		+10	815 500 000	-7.8	-0.000 001	-0.010
100%		+30	815 500 017	8.6	0.000 001	0.011
100%		+40	815 500 000	-8.0	-0.000 001	-0.010
100%		+50	815 500 000	-8.5	-0.000 001	-0.010
Batt. Endpoint		7.300	+20	815 500 016	7.9	0.000 001



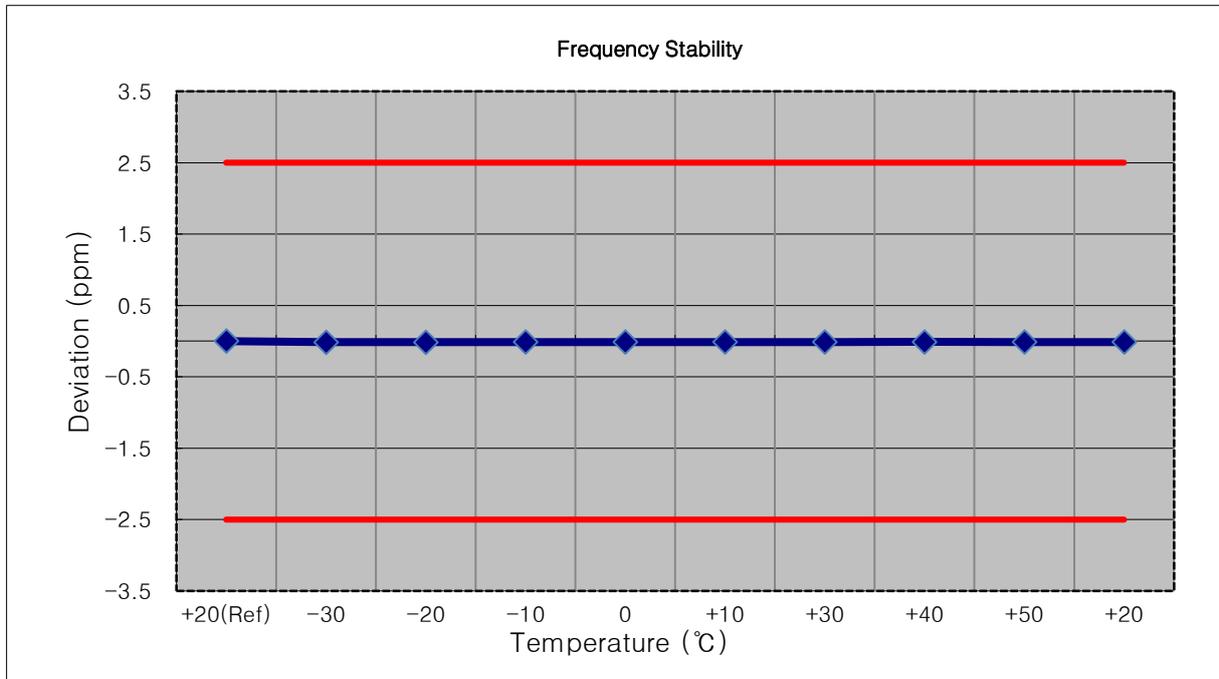
- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 816.500.000 Hz
- ▣ CHANNEL: 26715(5MHz)
- ▣ REFERENCE VOLTAGE: 7.70 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	7.700	+20(Ref)	816 499 996	0.0	0.000 000	0.000
100%		-30	816 499 998	2.6	0.000 000	0.003
100%		-20	816 499 997	1.7	0.000 000	0.002
100%		-10	816 499 994	-2.0	0.000 000	-0.002
100%		0	816 499 998	2.1	0.000 000	0.003
100%		+10	816 499 988	-8.2	-0.000 001	-0.010
100%		+30	816 499 988	-7.9	-0.000 001	-0.010
100%		+40	816 499 987	-9.1	-0.000 001	-0.011
100%		+50	816 499 989	-6.7	-0.000 001	-0.008
Batt. Endpoint		7.300	+20	816 499 989	-6.8	-0.000 001



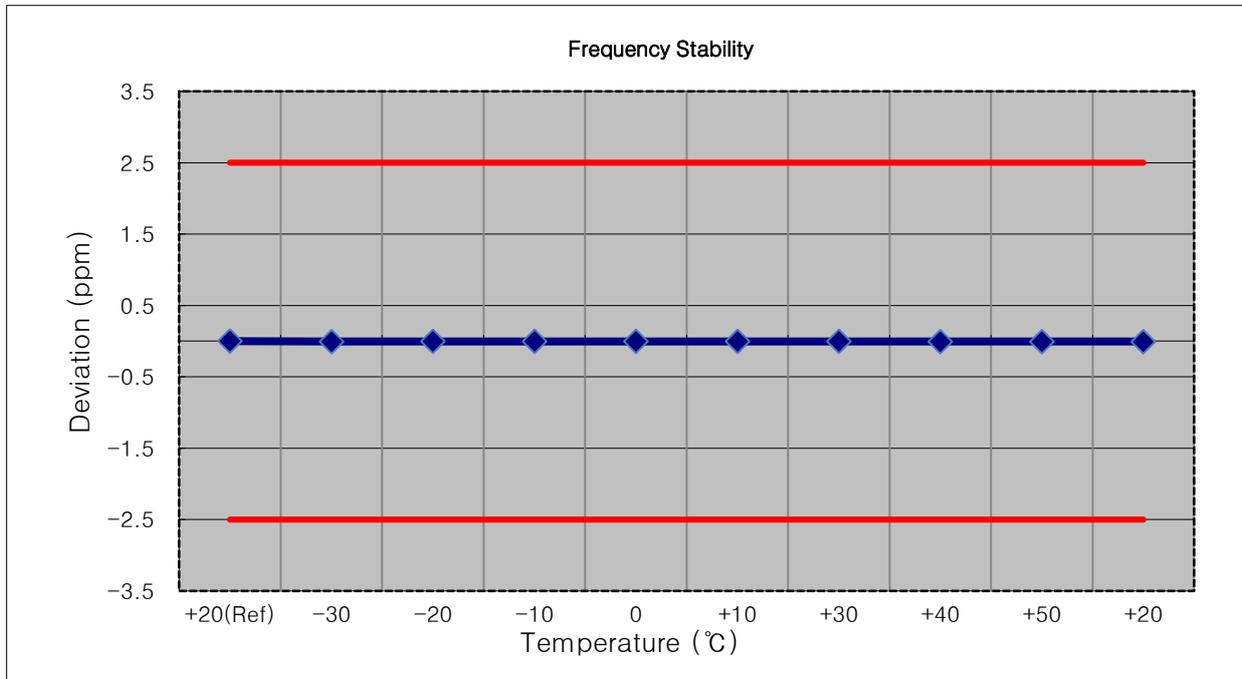
- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 819,000,000 Hz
- ▣ CHANNEL: 26740(10 MHz)
- ▣ REFERENCE VOLTAGE: 7.70 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	7.700	+20(Ref)	818 999 989	0.0	0.000 000	0.000
100%		-30	818 999 977	-11.4	-0.000 001	-0.014
100%		-20	818 999 978	-11.1	-0.000 001	-0.014
100%		-10	818 999 978	-10.6	-0.000 001	-0.013
100%		0	818 999 978	-10.8	-0.000 001	-0.013
100%		+10	818 999 979	-9.9	-0.000 001	-0.012
100%		+30	818 999 978	-11.0	-0.000 001	-0.013
100%		+40	818 999 980	-9.0	-0.000 001	-0.011
100%		+50	818 999 978	-10.4	-0.000 001	-0.013
Batt. Endpoint		7.300	+20	818 999 979	-9.6	-0.000 001



- ▣ MODE: LTE 26
- ▣ OPERATING FREQUENCY: 821,500,000 Hz
- ▣ CHANNEL: 26765(15 MHz)
- ▣ REFERENCE VOLTAGE: 7.70 VDC
- ▣ DEVIATION LIMIT: ± 0.000 25 % or 2.5 ppm

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	7.700	+20(Ref)	821 499 997	0.0	0.000 000	0.000
100%		-30	821 499 992	-4.2	-0.000 001	-0.005
100%		-20	821 499 994	-3.0	0.000 000	-0.004
100%		-10	821 499 993	-3.6	0.000 000	-0.004
100%		0	821 499 993	-3.2	0.000 000	-0.004
100%		+10	821 499 993	-3.5	0.000 000	-0.004
100%		+30	821 499 993	-3.6	0.000 000	-0.004
100%		+40	821 499 993	-4.1	0.000 000	-0.005
100%		+50	821 499 993	-4.1	0.000 000	-0.005
Batt. Endpoint		7.300	+20	821 499 993	-3.8	0.000 000



8.8 STADDLE CHANNEL

8.8.1 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
824.0	LTE B26/ 1.4 MHz	QPSK	-35.42	28.19	-10.25	1.28	V	< 7.00	0.046	16.66
		16QAM	-36.15	27.46	-10.25	1.28	V		0.039	15.93
		64QAM	-37.76	25.85	-10.25	1.28	V		0.027	14.32

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
824.0	LTE B26/ 3 MHz	QPSK	-35.37	28.24	-10.25	1.28	V	< 7.00	0.047	16.71
		16QAM	-36.15	27.46	-10.25	1.28	V		0.039	15.93
		64QAM	-37.75	25.86	-10.25	1.28	V		0.027	14.33

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
824.0	LTE B26/ 5 MHz	QPSK	-35.39	28.22	-10.25	1.28	V	< 7.00	0.047	16.69
		16QAM	-36.14	27.47	-10.25	1.28	V		0.039	15.94
		64QAM	-37.80	25.81	-10.25	1.28	V		0.027	14.28

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBd)	C.L	Pol	Limit	ERP	
									W	W
824.0	LTE B26/ 10 MHz	QPSK	-35.29	28.32	-10.25	1.28	V	< 7.00	0.048	16.79
		16QAM	-36.03	27.58	-10.25	1.28	V		0.040	16.05
		64QAM	-37.10	26.51	-10.25	1.28	V		0.031	14.98

8.8.2 RADIATED SPURIOUS EMISSIONS

- ▣ OPERATING FREQUENCY: 824.00 MHz
- ▣ MEASURED OUTPUT POWER: 18.81 dBm = 0.076 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 1.4 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.81 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26790 (824.0)	1,648.00	-51.44	9.50	-62.20	1.84	H	-54.54	73.36
	2,472.00	-55.80	10.60	-60.84	2.28	H	-52.52	71.33
	3,296.00	-55.57	12.25	-57.39	2.69	H	-47.83	66.65

- ▣ OPERATING FREQUENCY: 824.00 MHz
- ▣ MEASURED OUTPUT POWER: 18.86 dBm = 0.077 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 3 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.86 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26790 (824.0)	1,648.00	-52.02	9.50	-62.78	1.84	V	-55.12	73.99
	2,472.00	-55.58	10.60	-60.62	2.28	H	-52.30	71.16
	3,296.00	-57.31	12.25	-59.13	2.69	V	-49.57	68.44

- ▣ OPERATING FREQUENCY: 824.00 MHz
- ▣ MEASURED OUTPUT POWER: 18.84 dBm = 0.077 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 5 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.84 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26790 (824.0)	1,648.00	-52.27	9.50	-63.03	1.84	V	-55.37	74.22
	2,472.00	-55.56	10.60	-60.60	2.28	V	-52.28	71.12
	3,296.00	-56.51	12.25	-58.33	2.69	V	-48.77	67.62

- ▣ OPERATING FREQUENCY: 824.00 MHz
- ▣ MEASURED OUTPUT POWER: 18.94 dBm = 0.078 W
- ▣ MODE: LTE B26
- ▣ MODULATION SIGNAL: 10 MHz QPSK
- ▣ DISTANCE: 3 meters
- ▣ LIMIT: $43 + 10 \log_{10}(W) =$ 31.94 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
26790 (824.0)	1,648.00	-51.66	9.50	-62.42	1.84	V	-54.76	73.71
	2,472.00	-53.99	10.60	-59.03	2.28	H	-50.71	69.65
	3,296.00	-55.07	12.25	-56.89	2.69	H	-47.33	66.28

8.8.3 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
26	1.4	824.0	3.6935	27.976	-66.756	-38.780	-13.00
	3		3.6975	27.976	-67.268	-39.292	
	5		3.6780	27.976	-67.273	-39.297	
	10		3.6980	27.976	-67.114	-39.138	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 89 ~ 92.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor(dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20	30.131

8.8.4 CHANNEL EDGE(Part90)

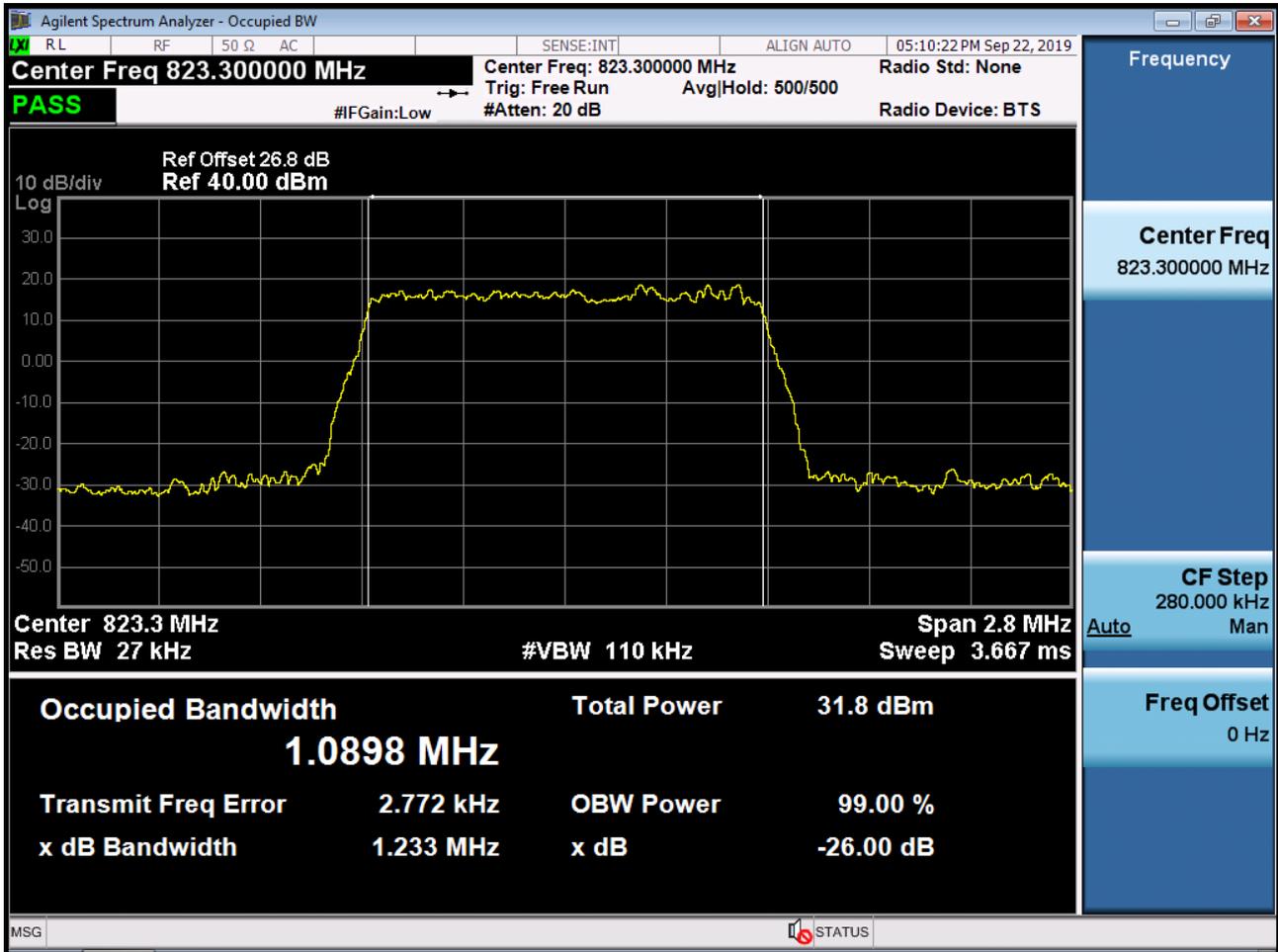
- Test Channel : 26790(824.0MHz)
- Plots of the EUT's Band Edge are shown Page 93 ~ 104.

8.8.5 BAND EDGE(Part22)

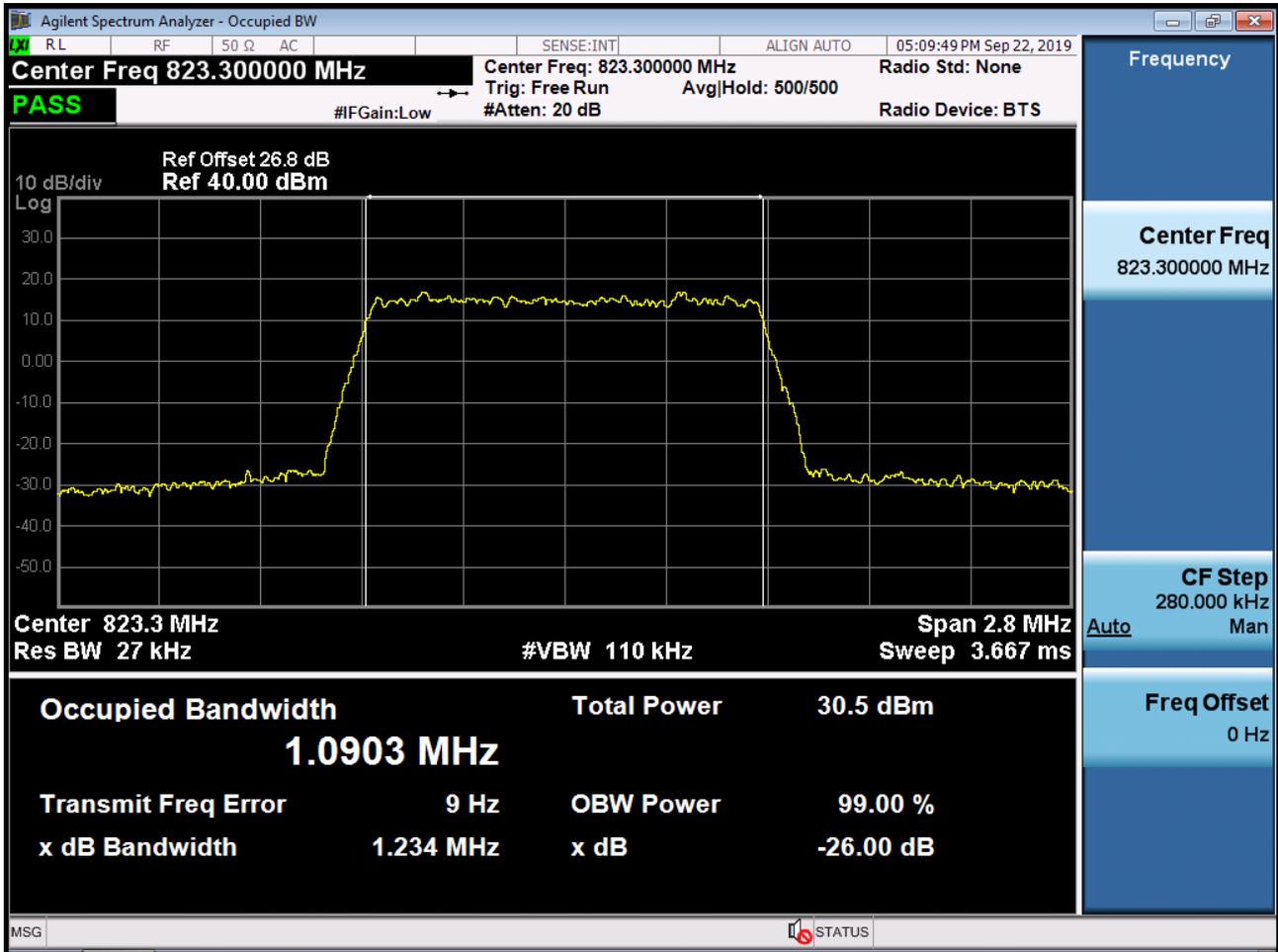
- Test Channel : 26790(824.0MHz)
- Plots of the EUT's Band Edge are shown Page 105 ~ 112.

9. TEST PLOTS

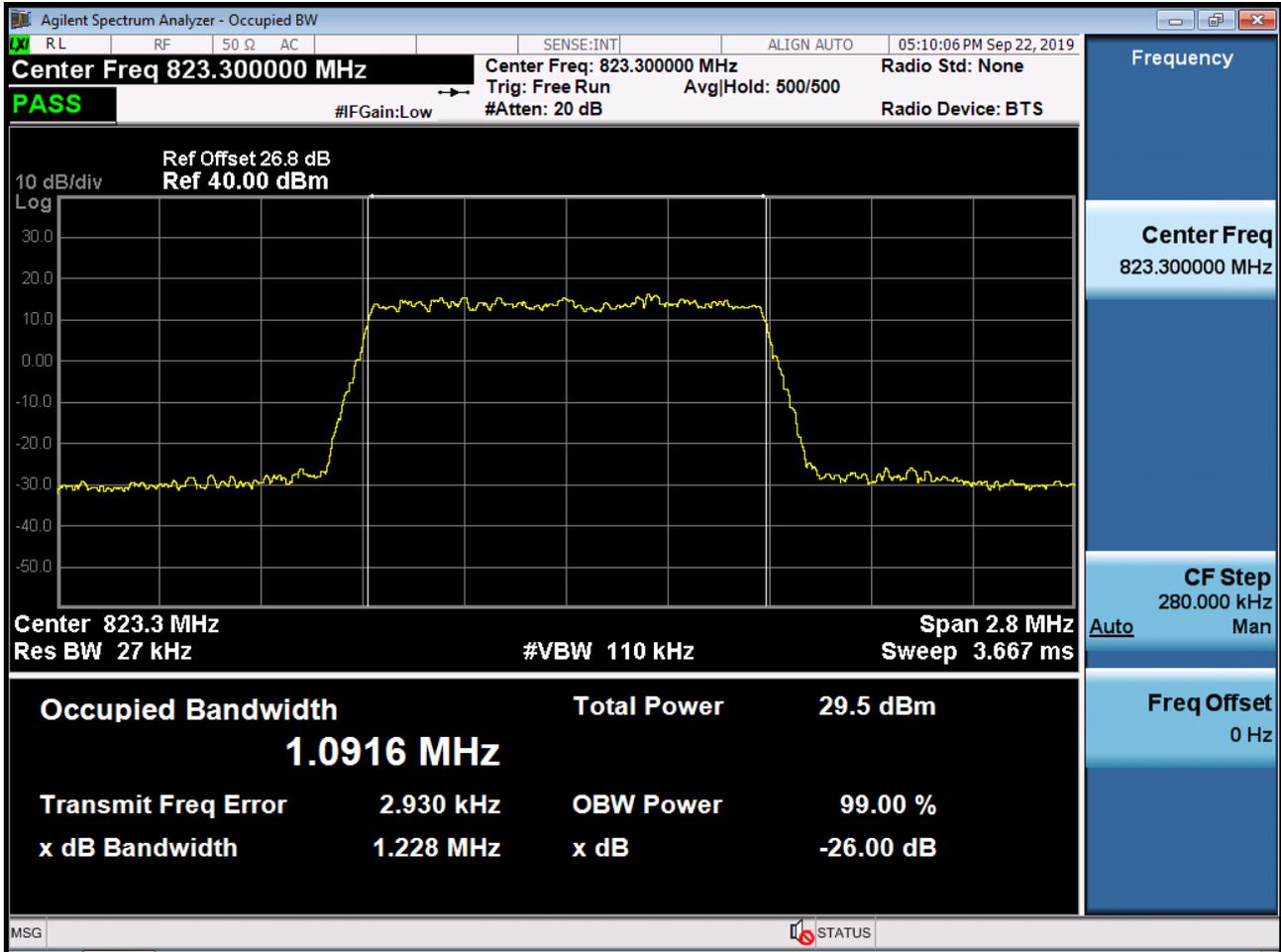
BAND 26. Occupied Bandwidth Plot (1.4M BW Ch.26783 QPSK RB 6_0)



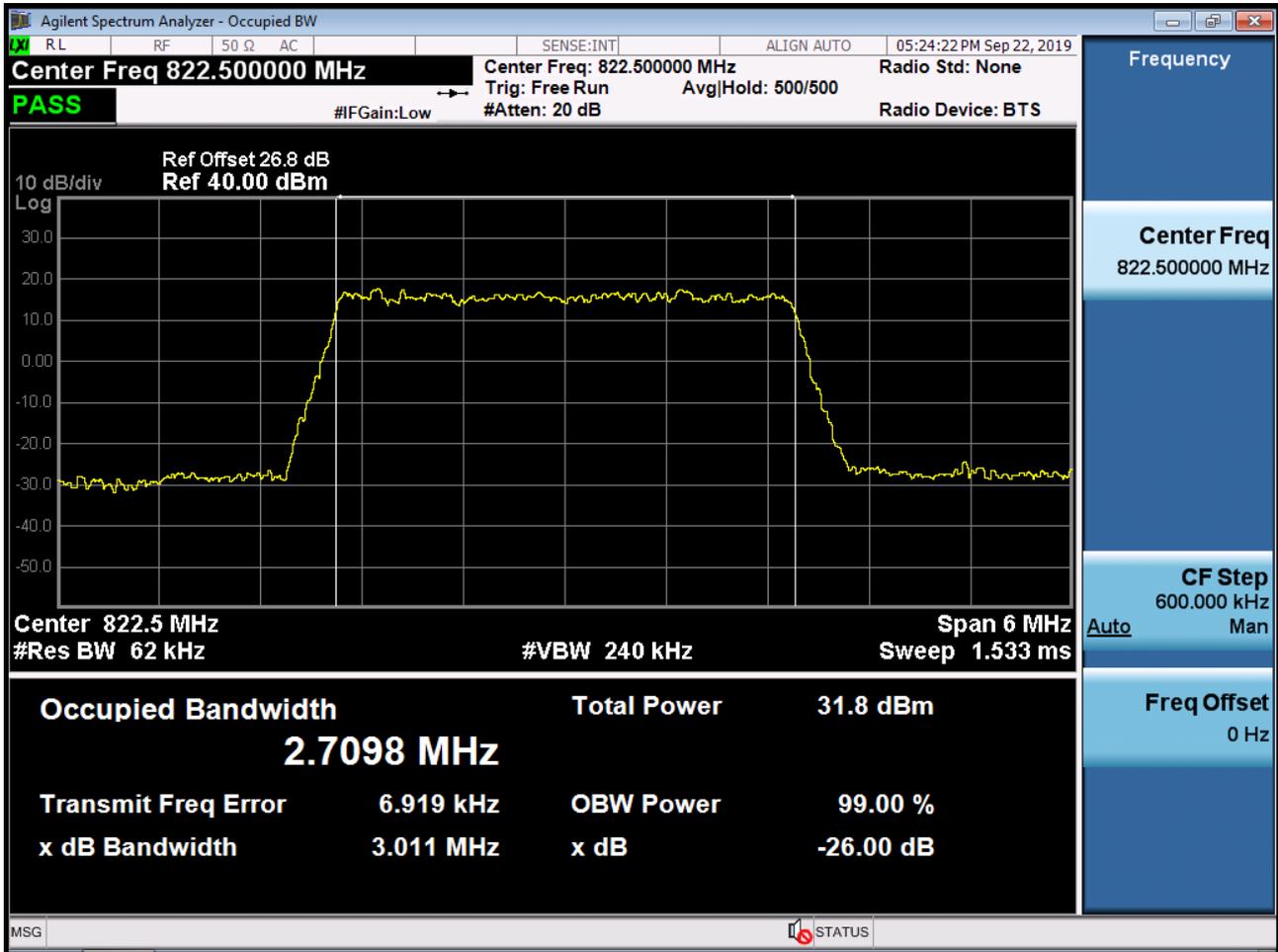
BAND 26. Occupied Bandwidth Plot (1.4M BW Ch.26783 16QAM RB 6_0)



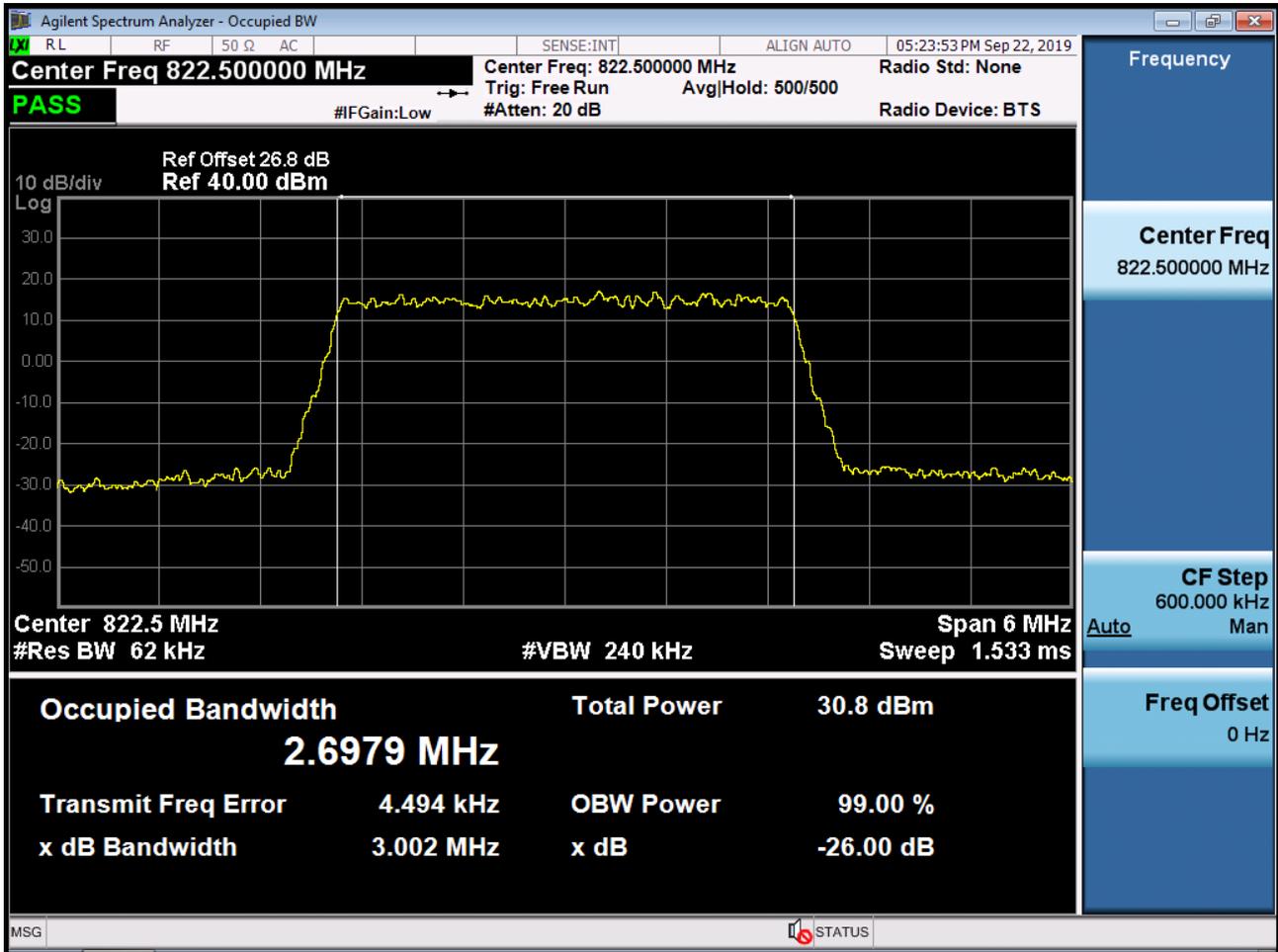
BAND 26. Occupied Bandwidth Plot (1.4M BW Ch.26783 64QAM RB 6_0)



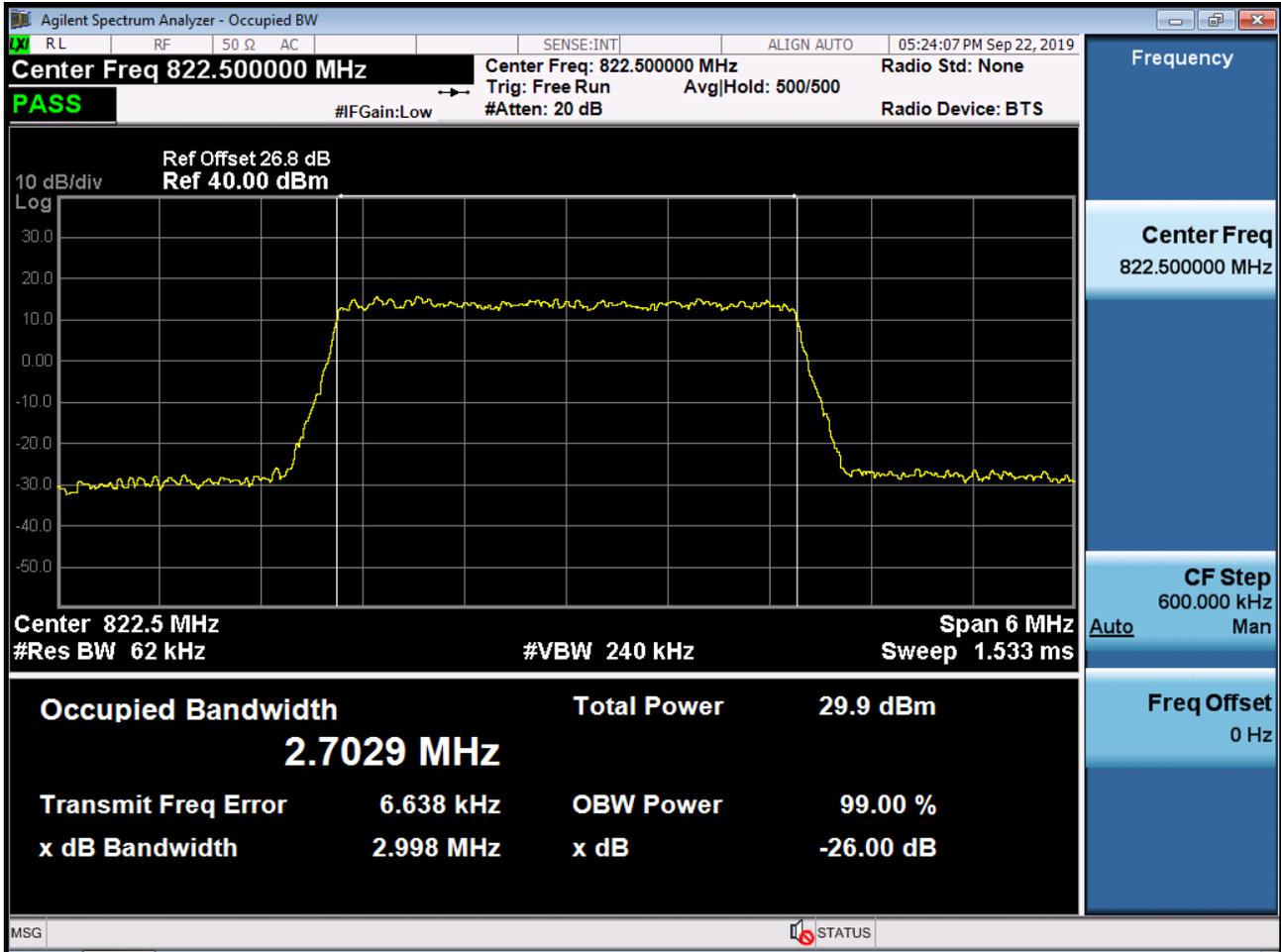
BAND 26. Occupied Bandwidth Plot (3M BW Ch.26775 QPSK RB 15_0)



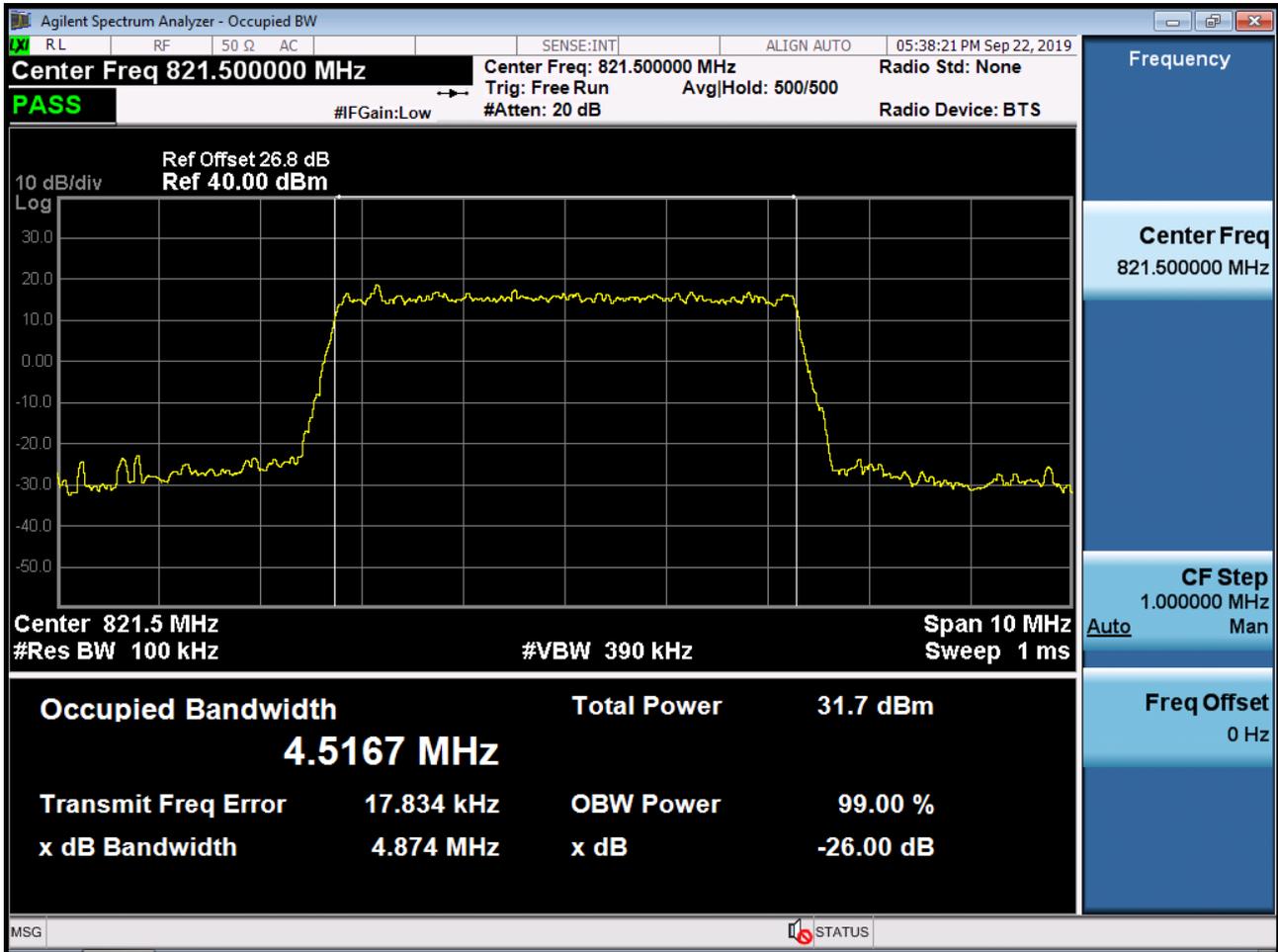
BAND 26. Occupied Bandwidth Plot (3M BW Ch.26775 16QAM RB 15_0)



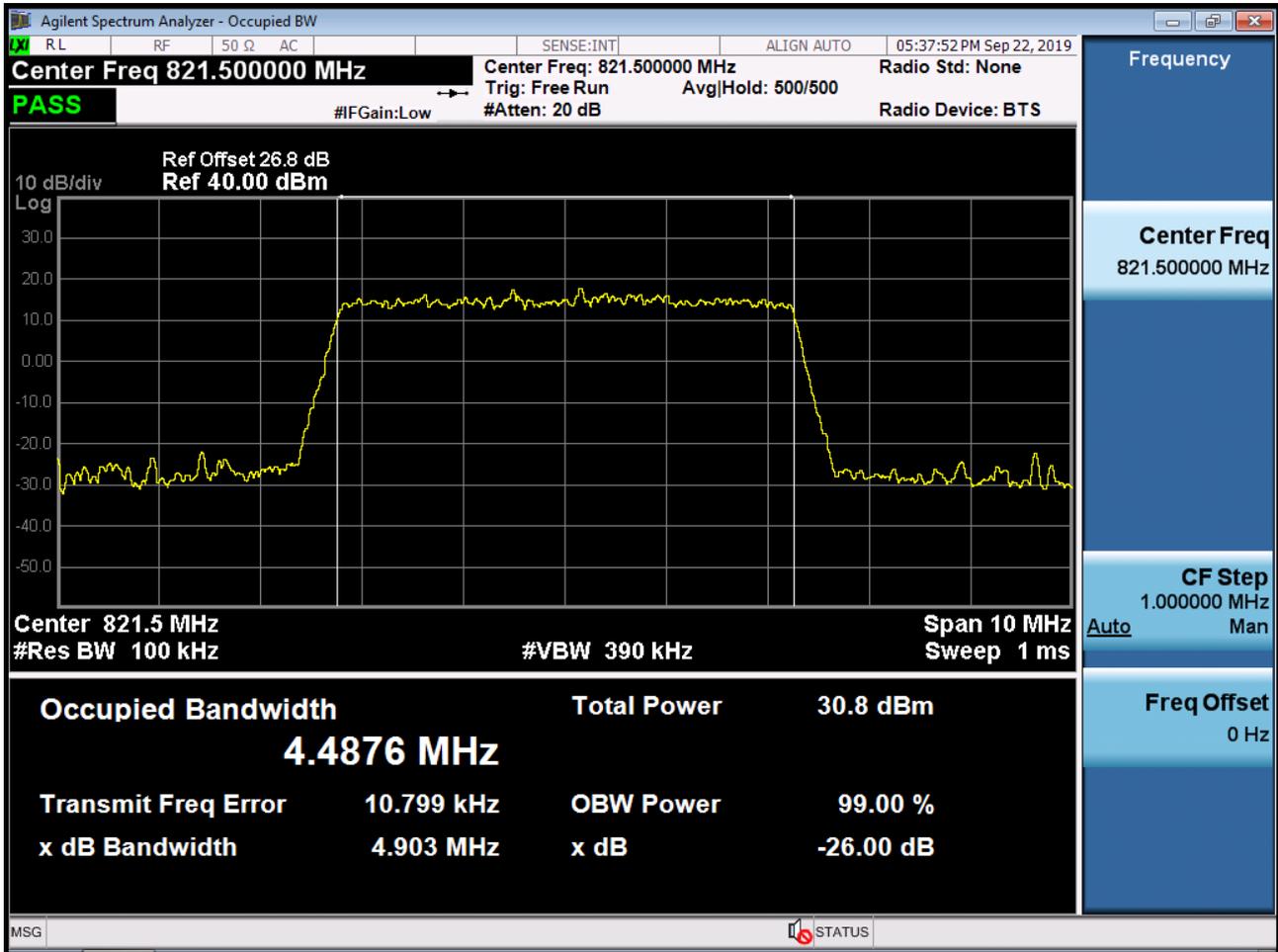
BAND 26. Occupied Bandwidth Plot (3M BW Ch.26775 64QAM RB 15_0)



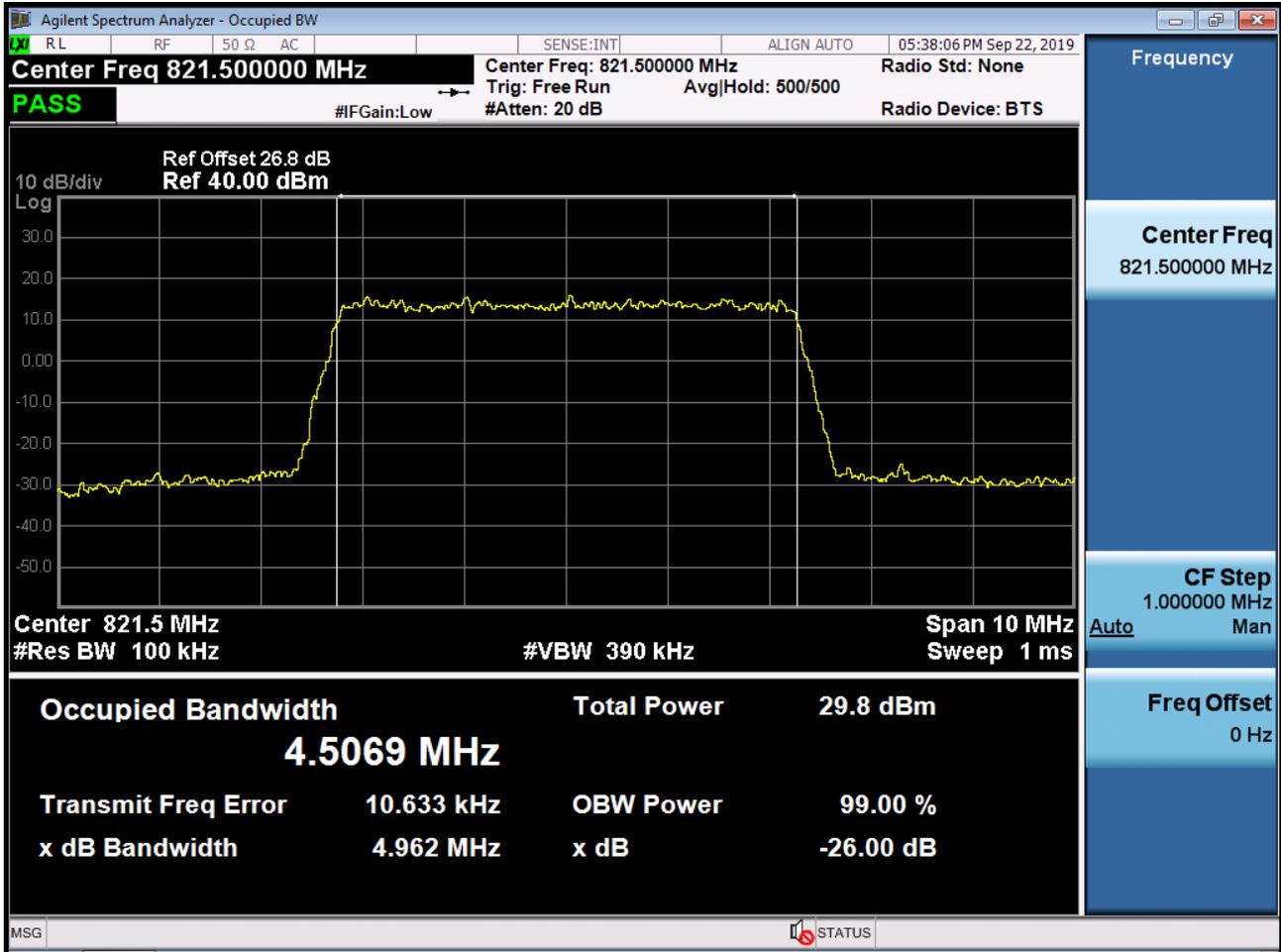
BAND 26. Occupied Bandwidth Plot (5M BW Ch.26765 QPSK RB 25_0)



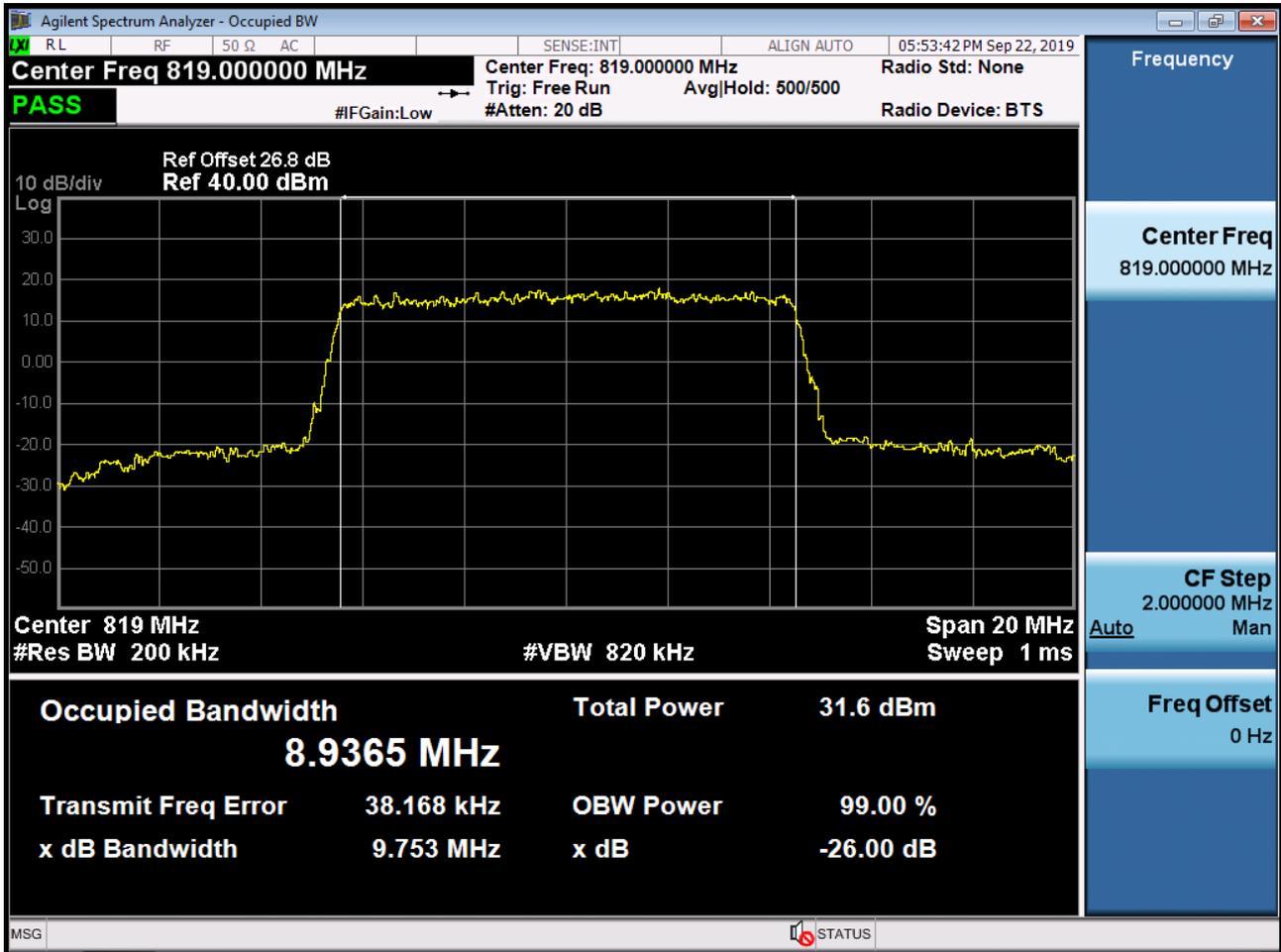
BAND 26. Occupied Bandwidth Plot (5M BW Ch.26765 16QAM RB 25_0)



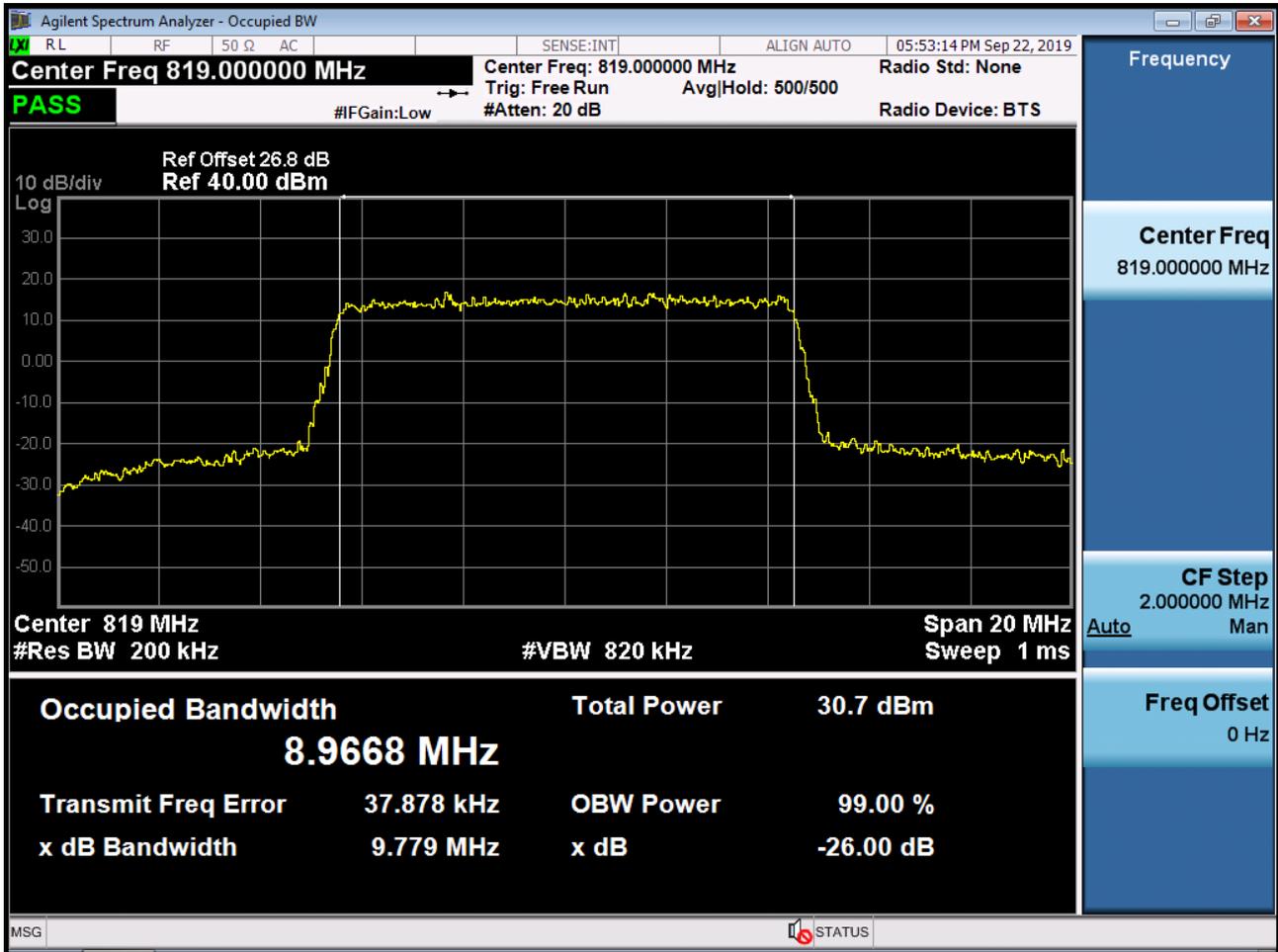
BAND 26. Occupied Bandwidth Plot (5M BW Ch.26765 64QAM RB 25_0)



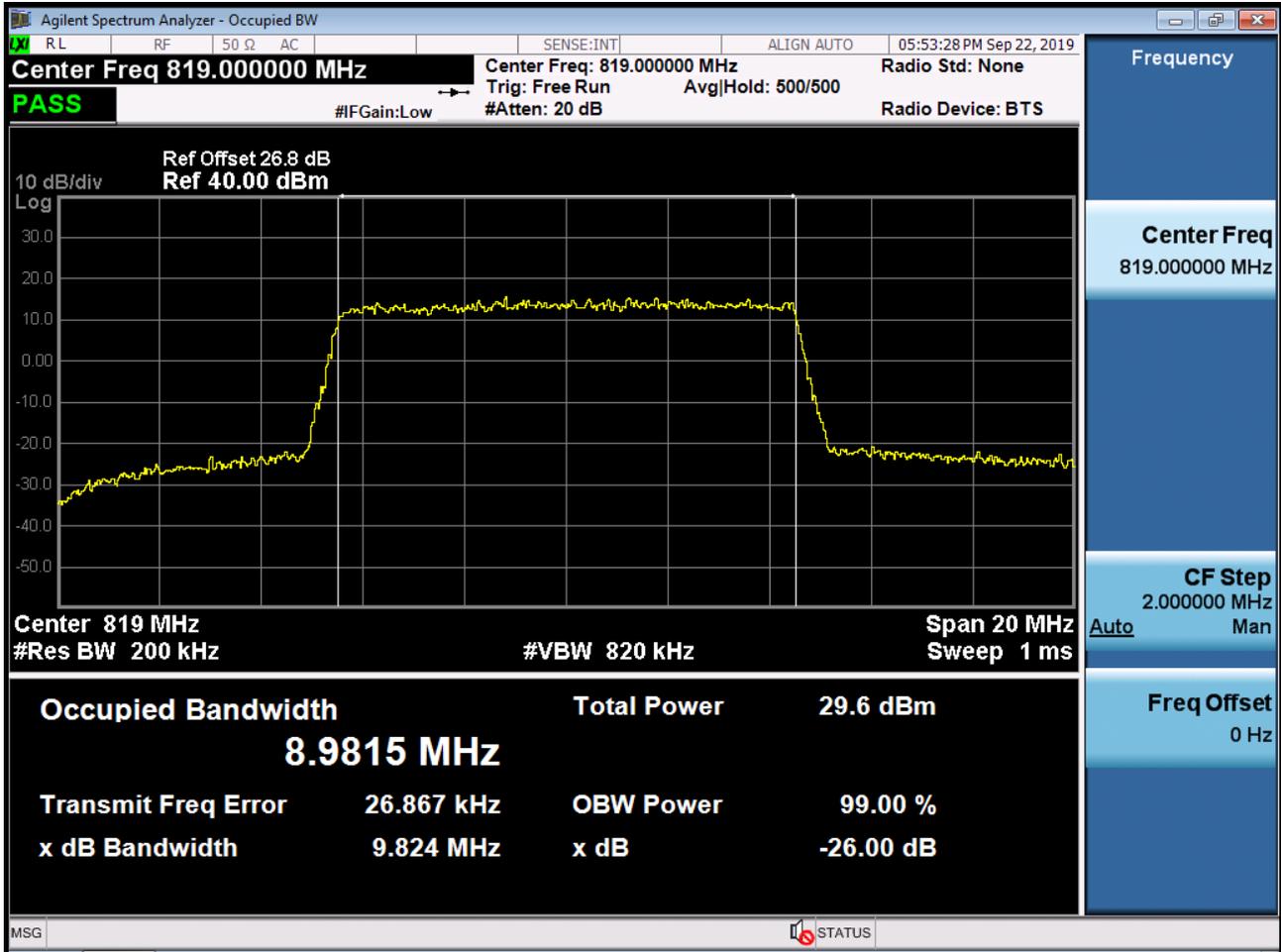
BAND 26. Occupied Bandwidth Plot (10M BW Ch.26740 QPSK RB 50_0)



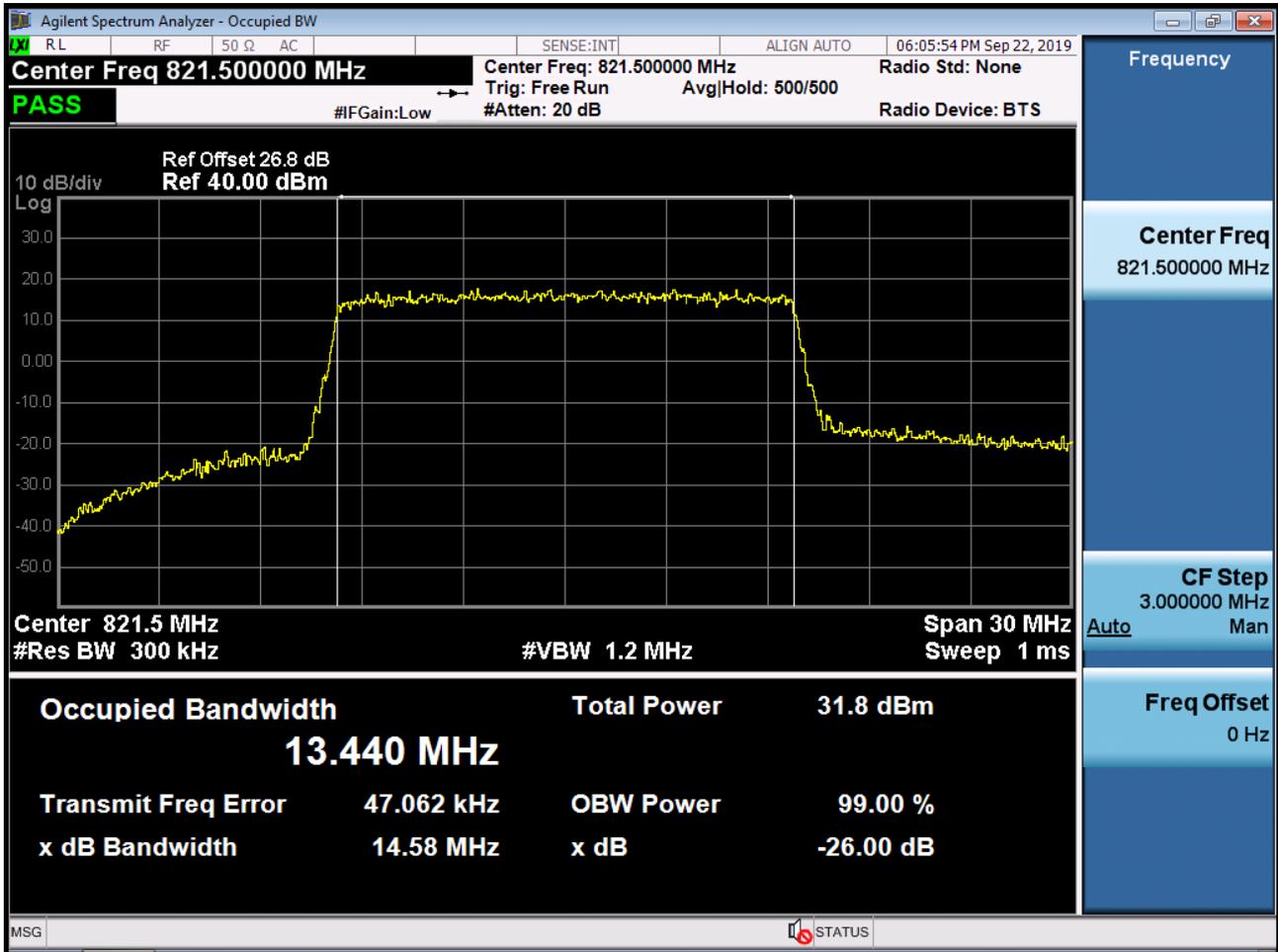
BAND 26. Occupied Bandwidth Plot (10M BW Ch.26740 16QAM RB 50_0)



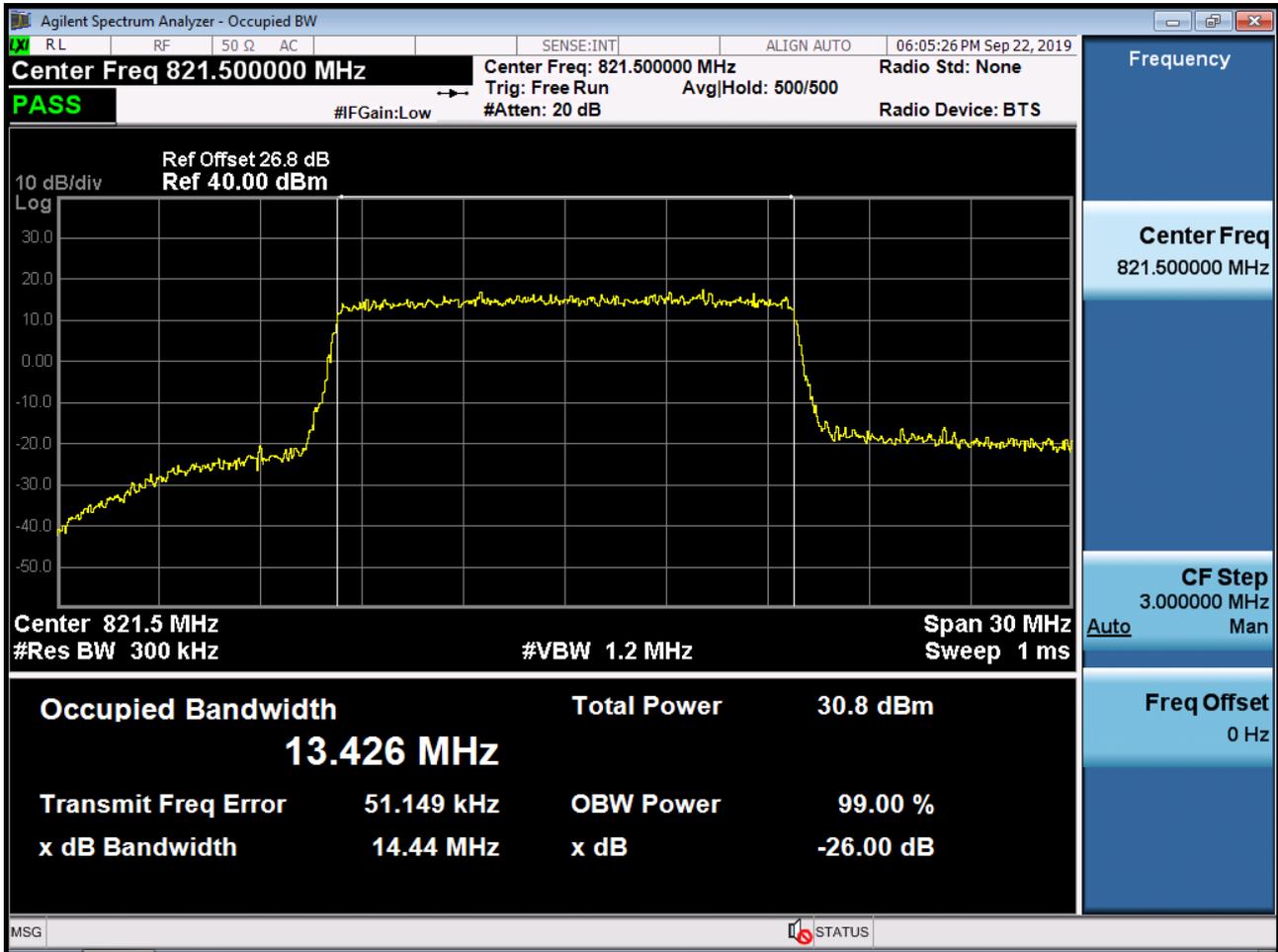
BAND 26. Occupied Bandwidth Plot (10M BW Ch.26740 64QAM RB 50_0)



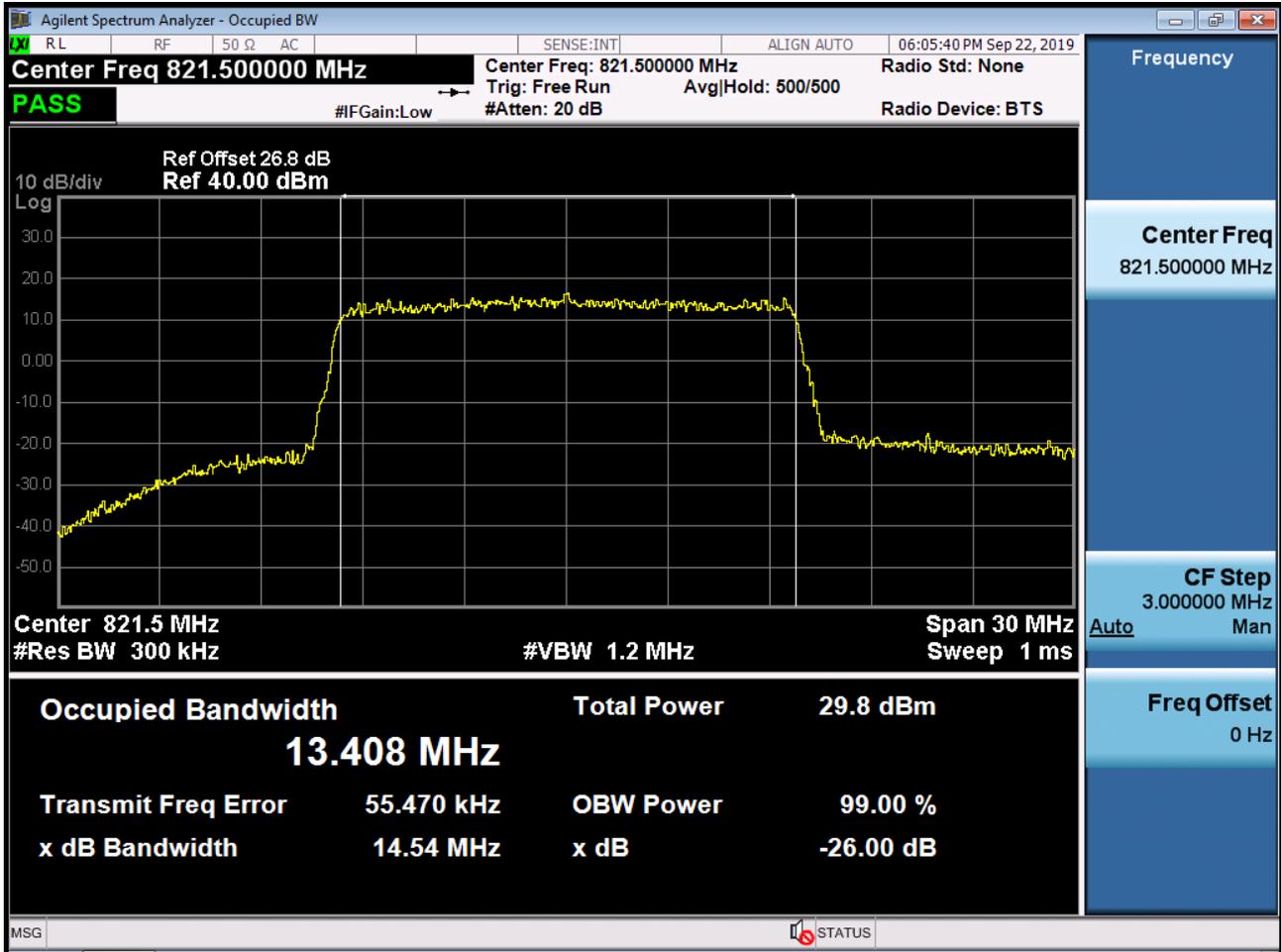
BAND 26. Occupied Bandwidth Plot (15M BW Ch.26765 QPSK RB 75_0)



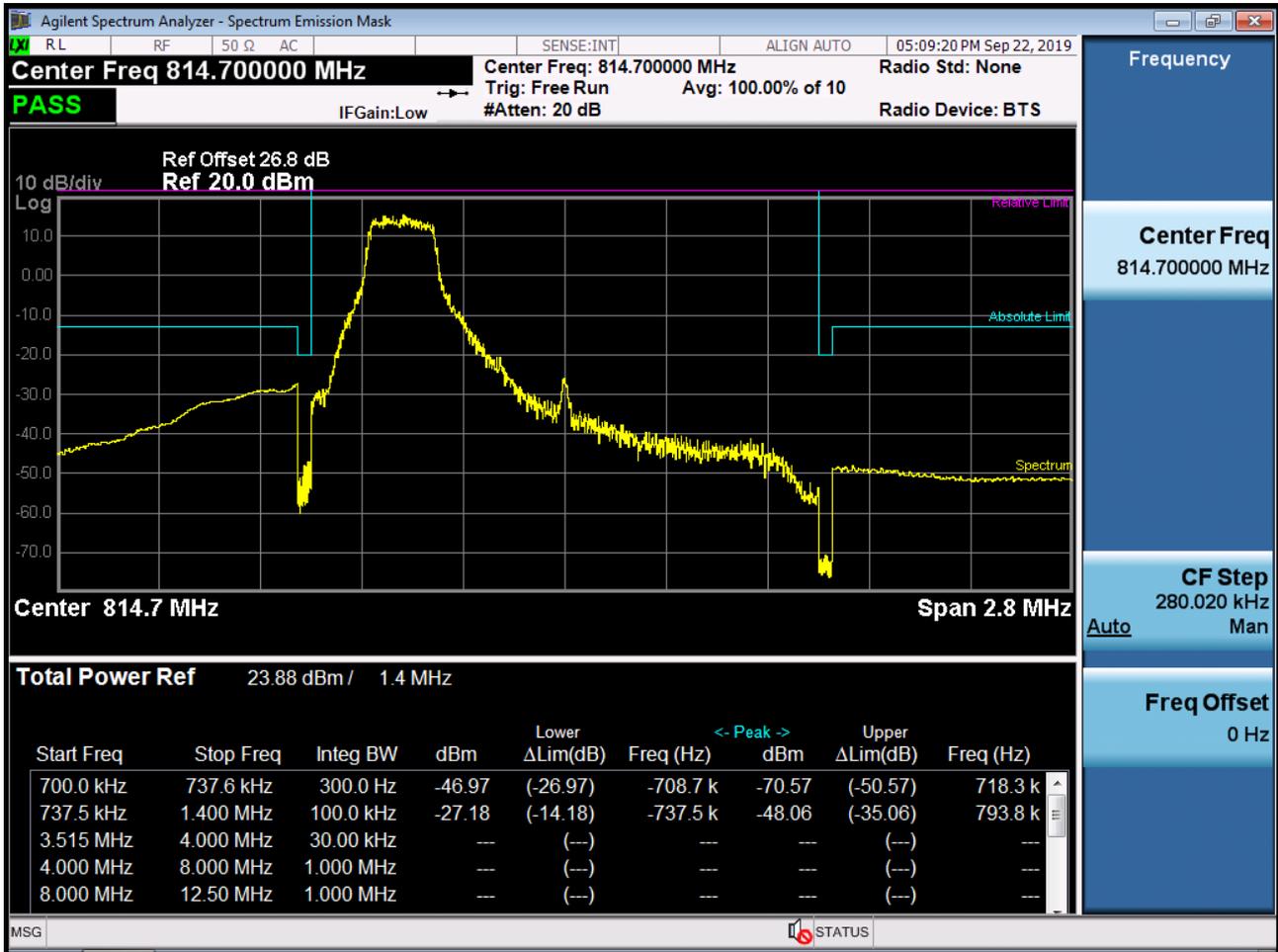
BAND 26. Occupied Bandwidth Plot (15M BW Ch.26765 16QAM RB 75_0)



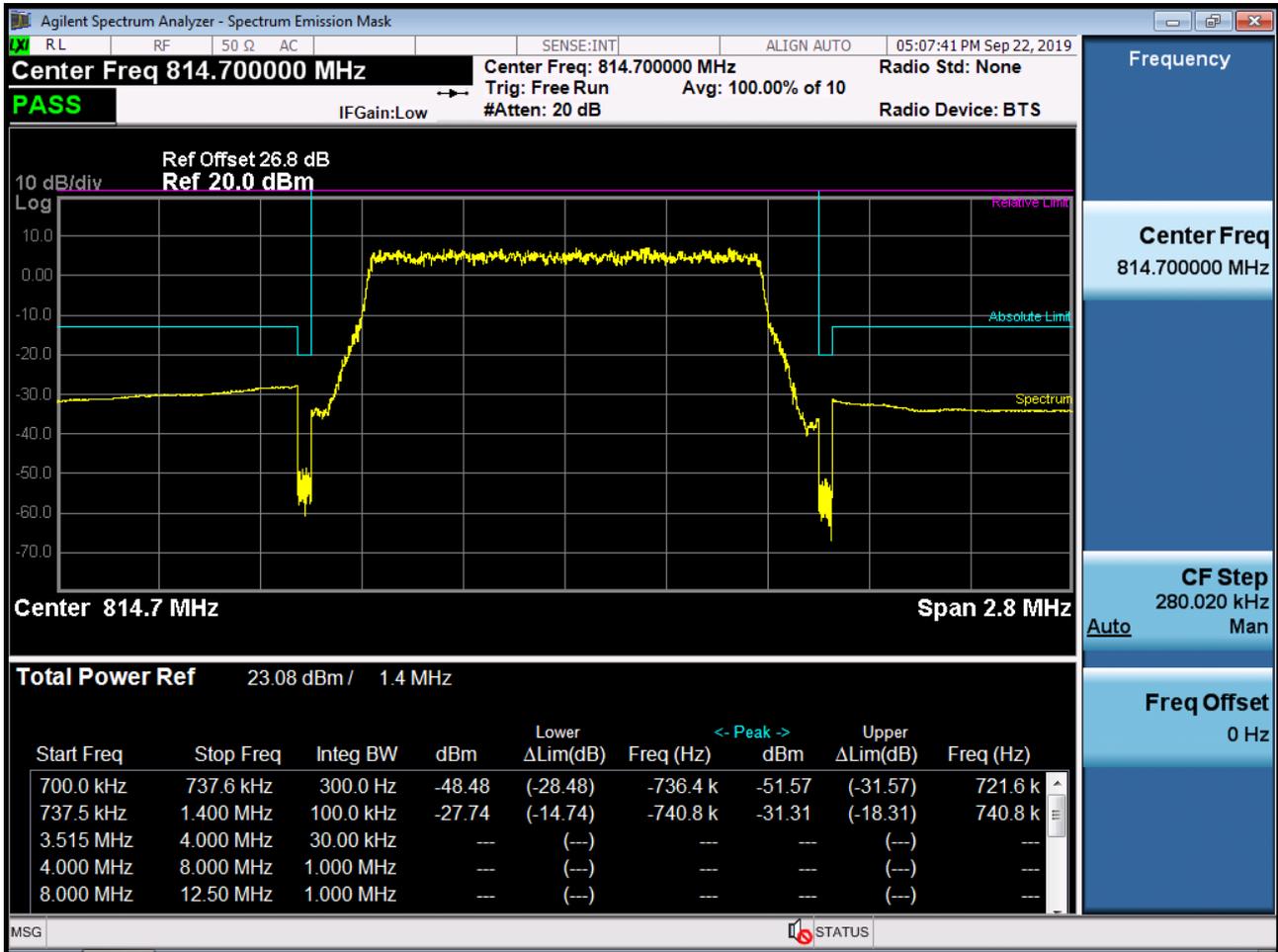
BAND 26. Occupied Bandwidth Plot (15M BW Ch.26765 64QAM RB 75_0)



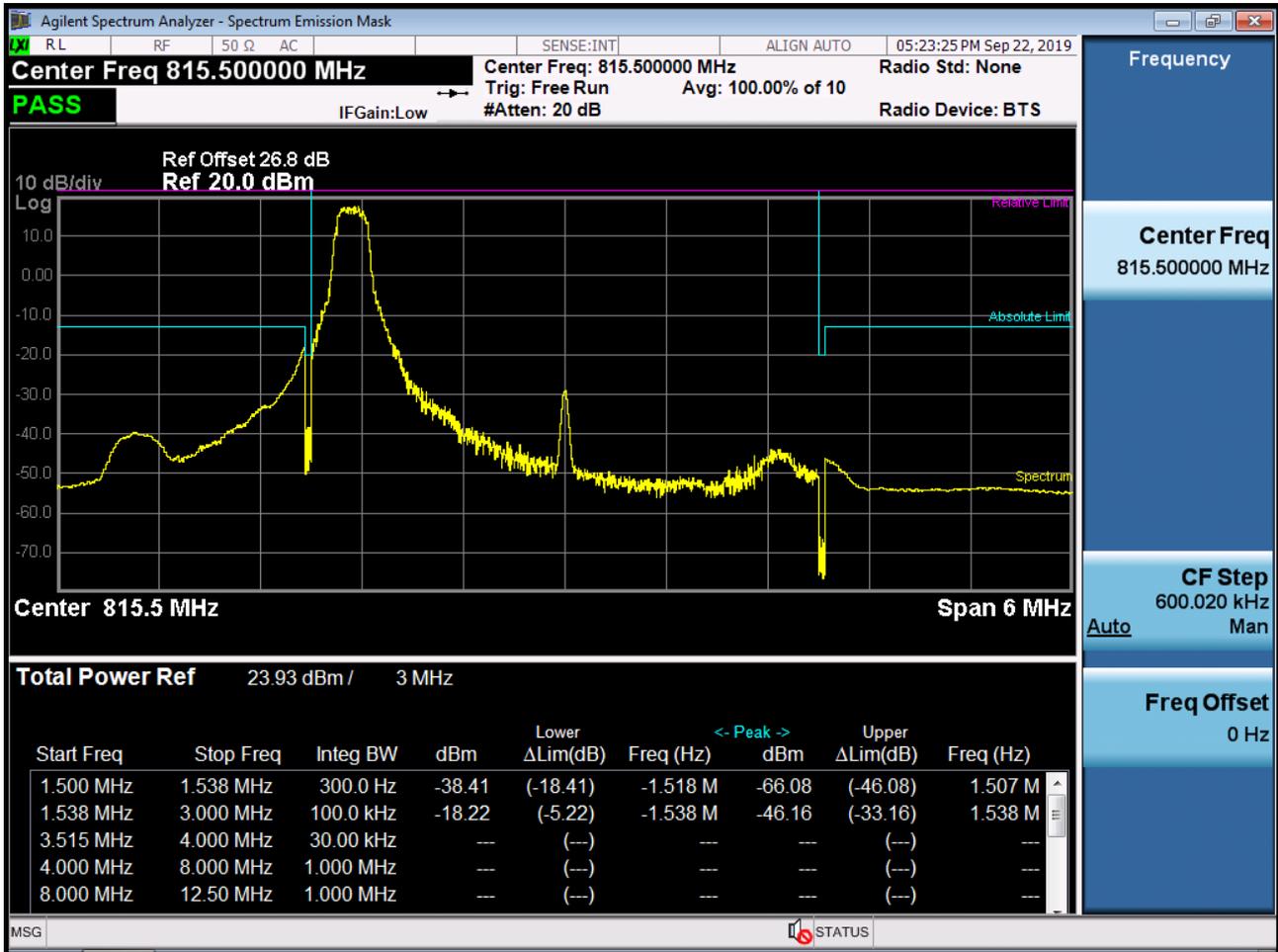
BAND 26. Lower Channel Edge Plot (1.4M BW Ch.26697 QPSK RB 1, Offset 0)



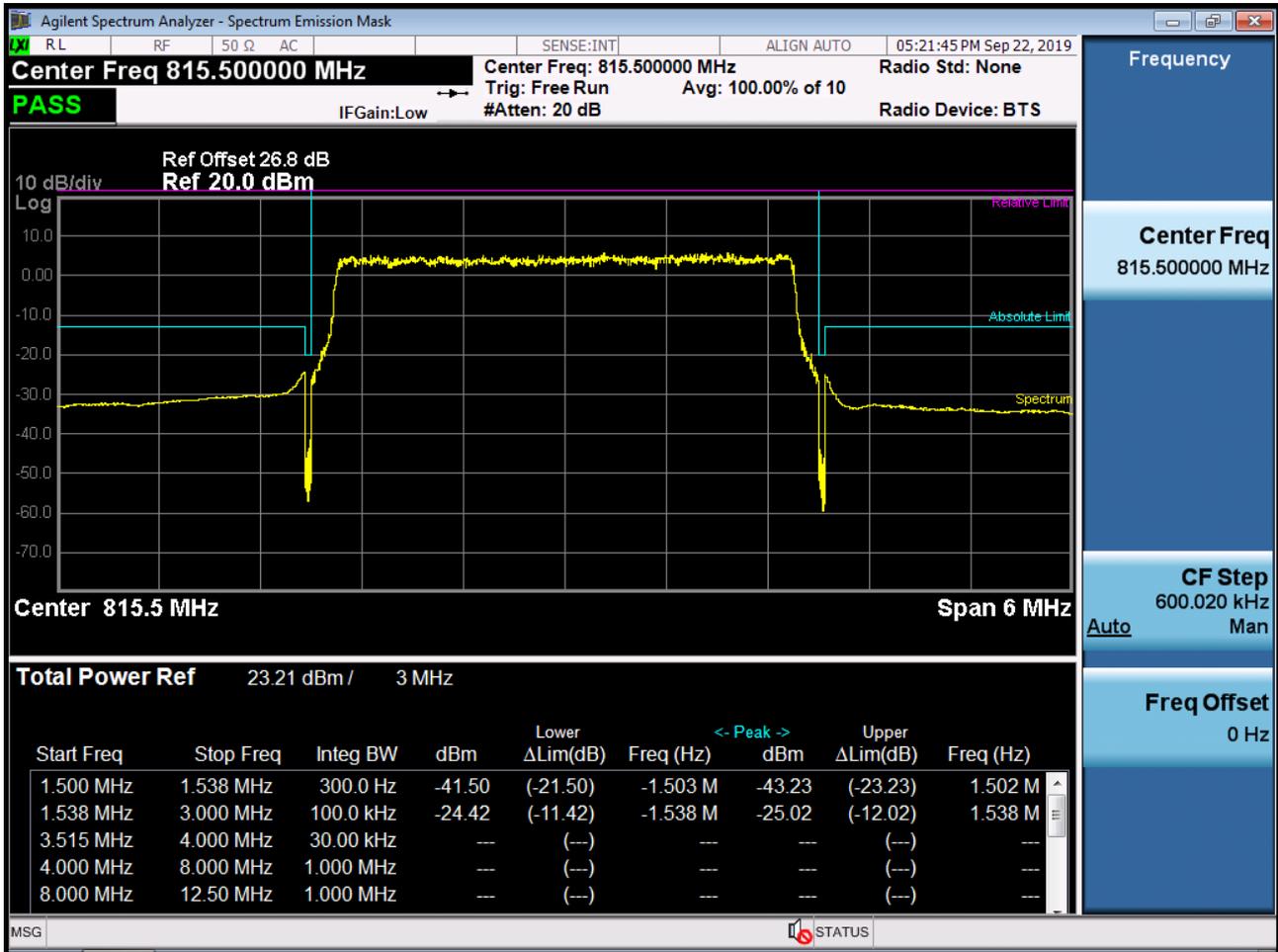
BAND 26. Lower Channel Edge Plot (1.4M BW Ch.26697 QPSK_RB6_Offset 0)



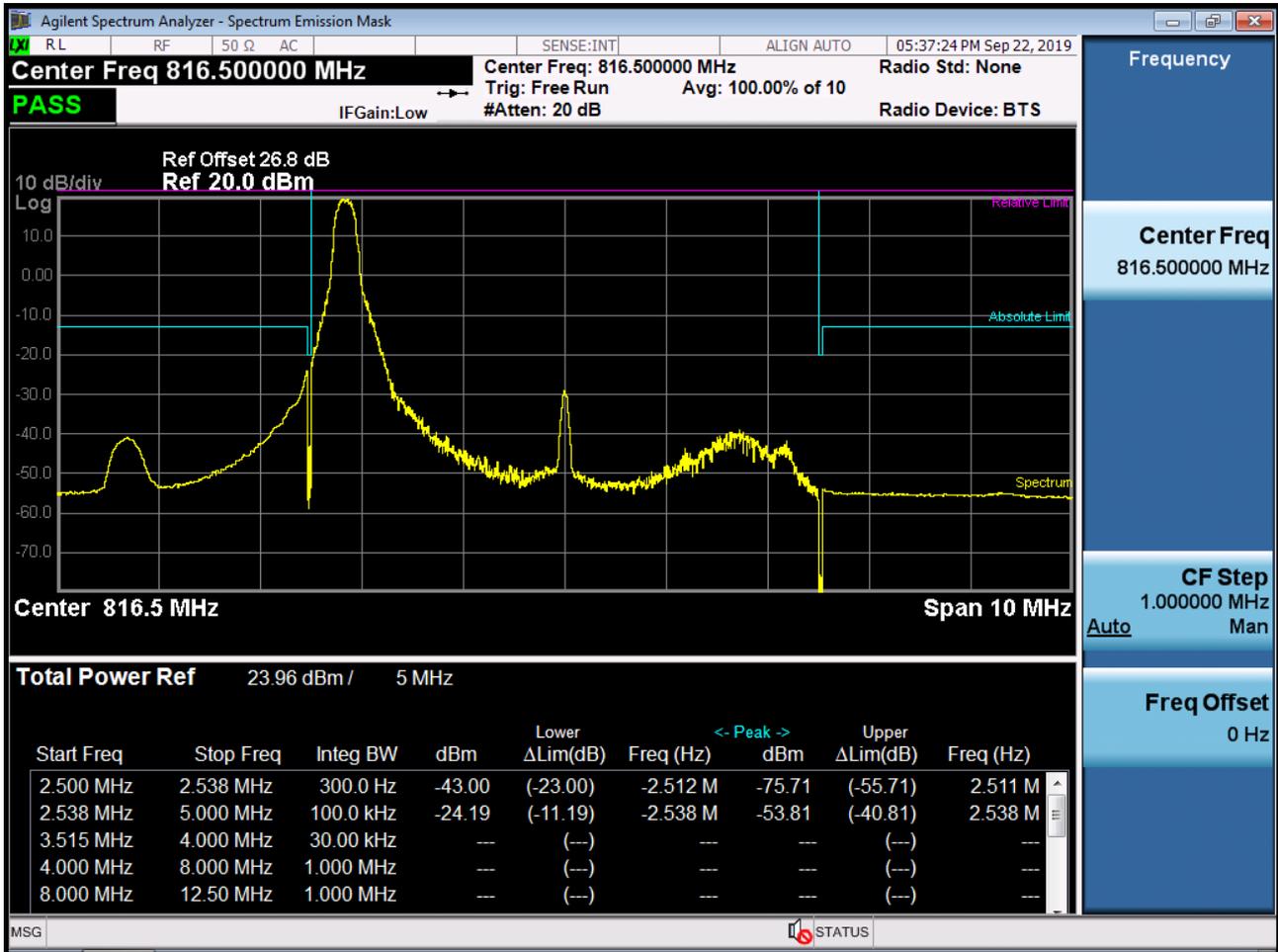
BAND 26. Lower Channel Edge Plot (3M BW Ch.26705 QPSK RB 1, Offset 0)



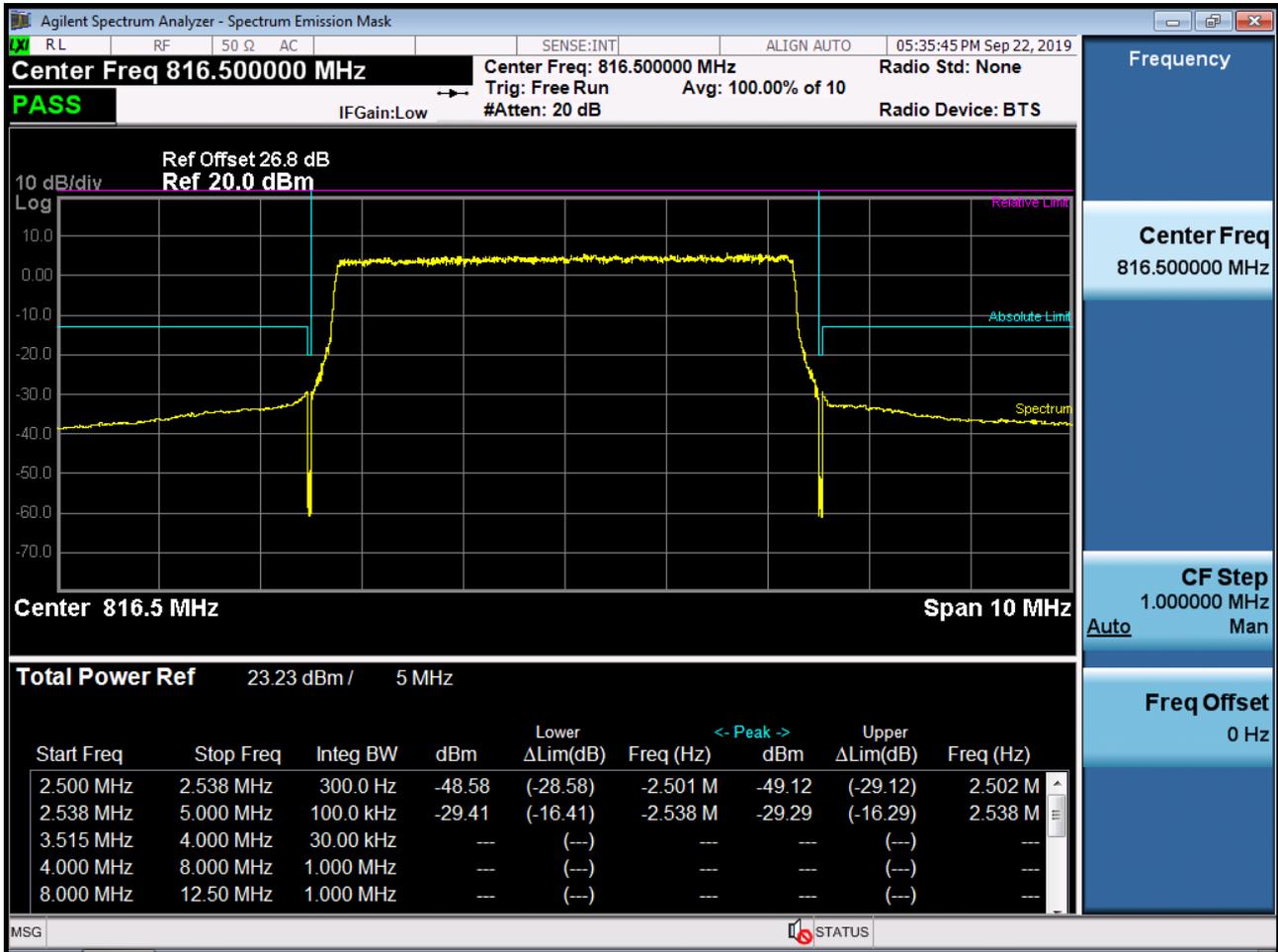
BAND 26. Lower Channel Edge Plot (3M BW Ch.26705 QPSK_RB15_Offset 0)



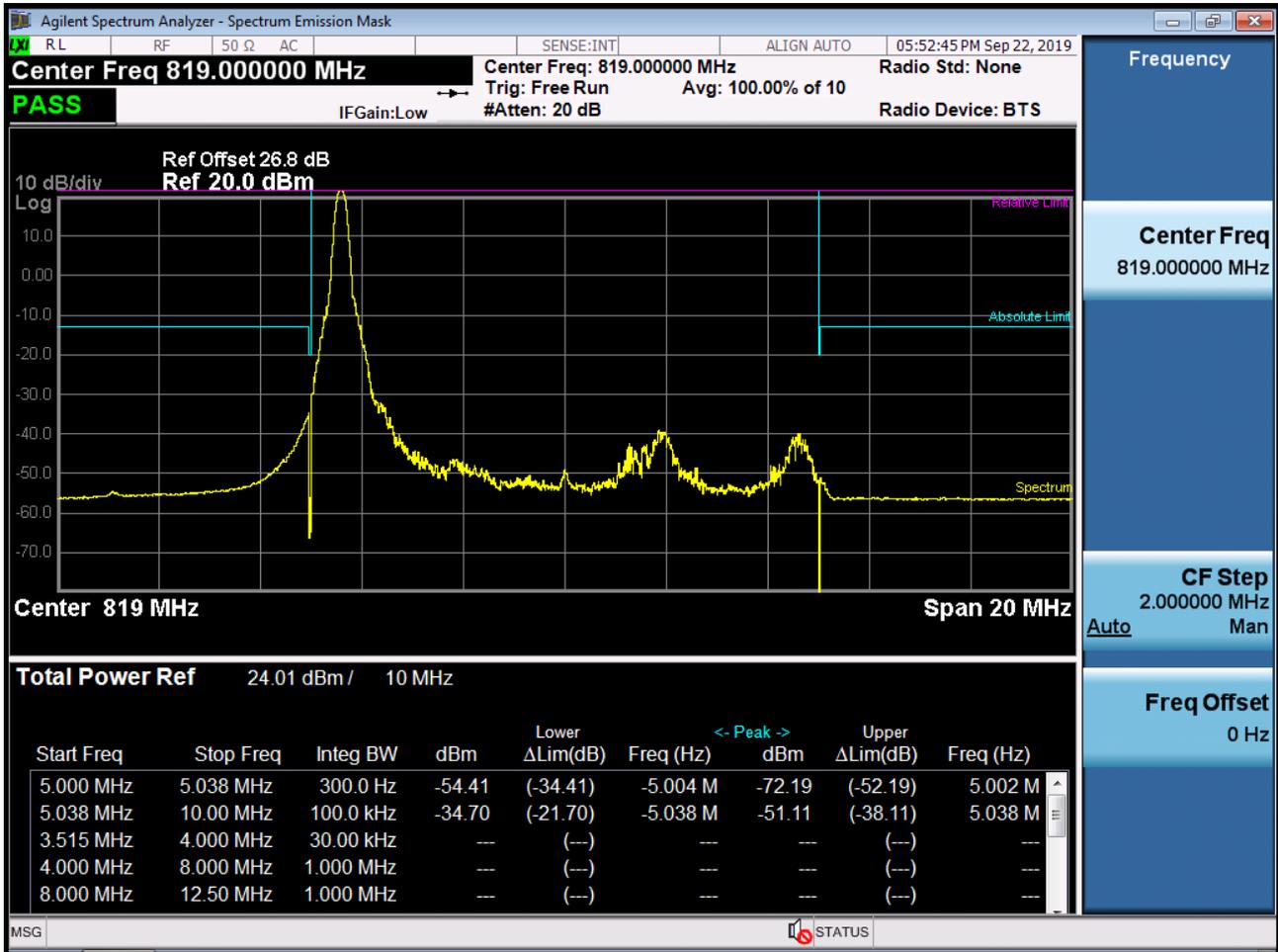
BAND 26. Lower Channel Edge Plot (5M BW Ch.26715 QPSK RB 1, Offset 0)



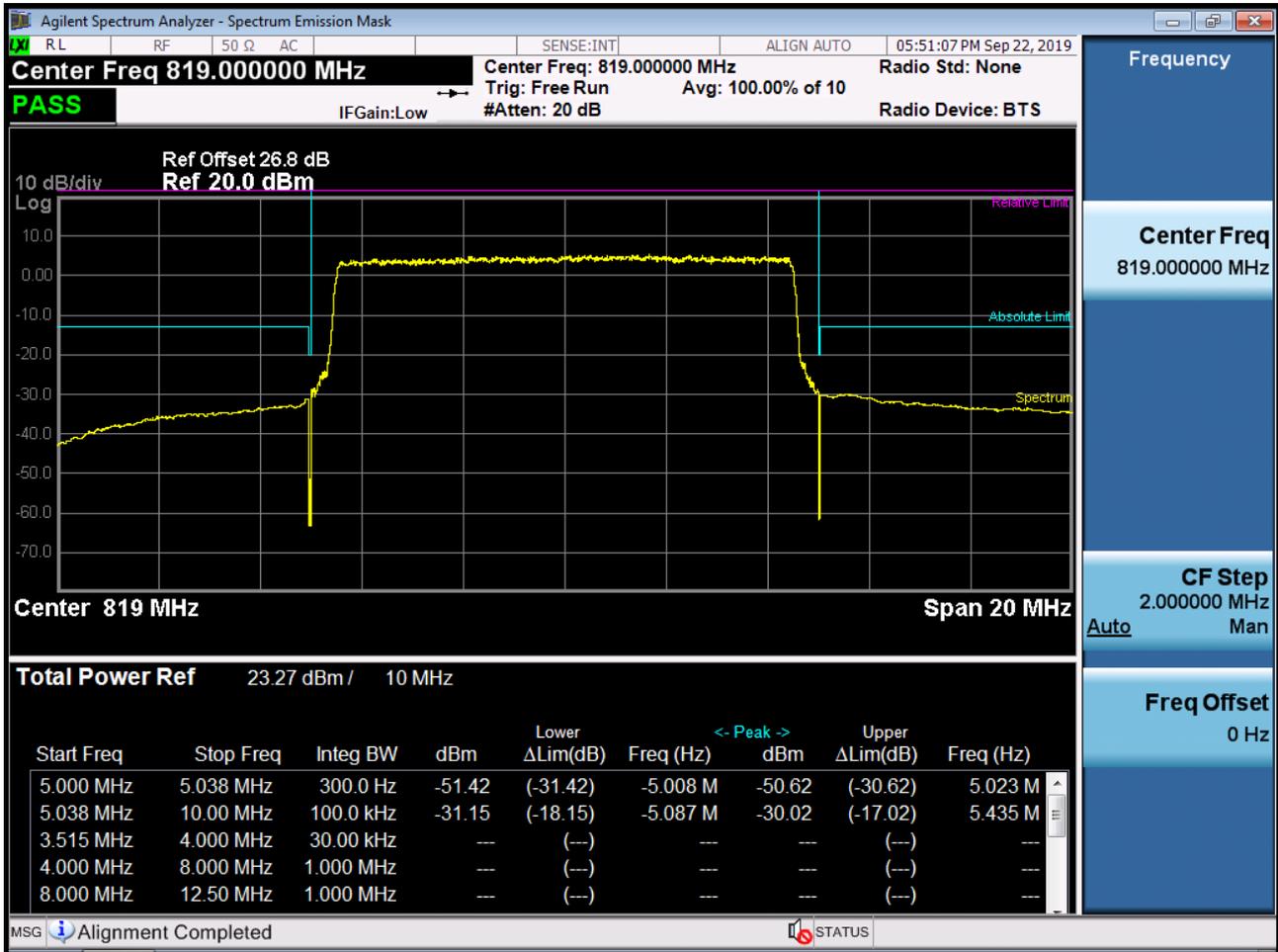
BAND 26. Lower Channel Edge Plot (5M BW Ch.26715 QPSK_RB25_Offset 0)



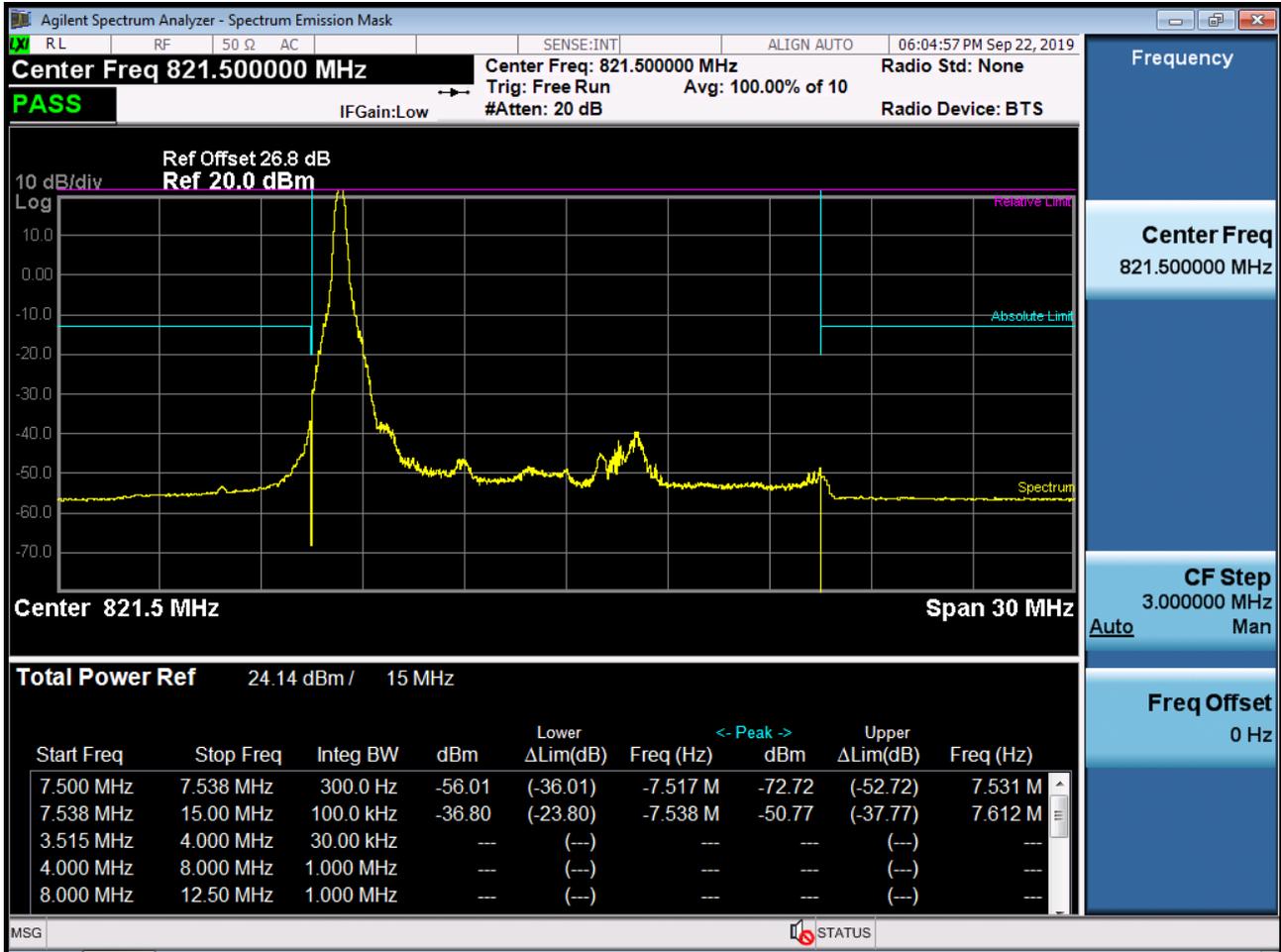
BAND 26. Low Channel Edge Plot (10M BW Ch.26740 QPSK RB 1, Offset 0)



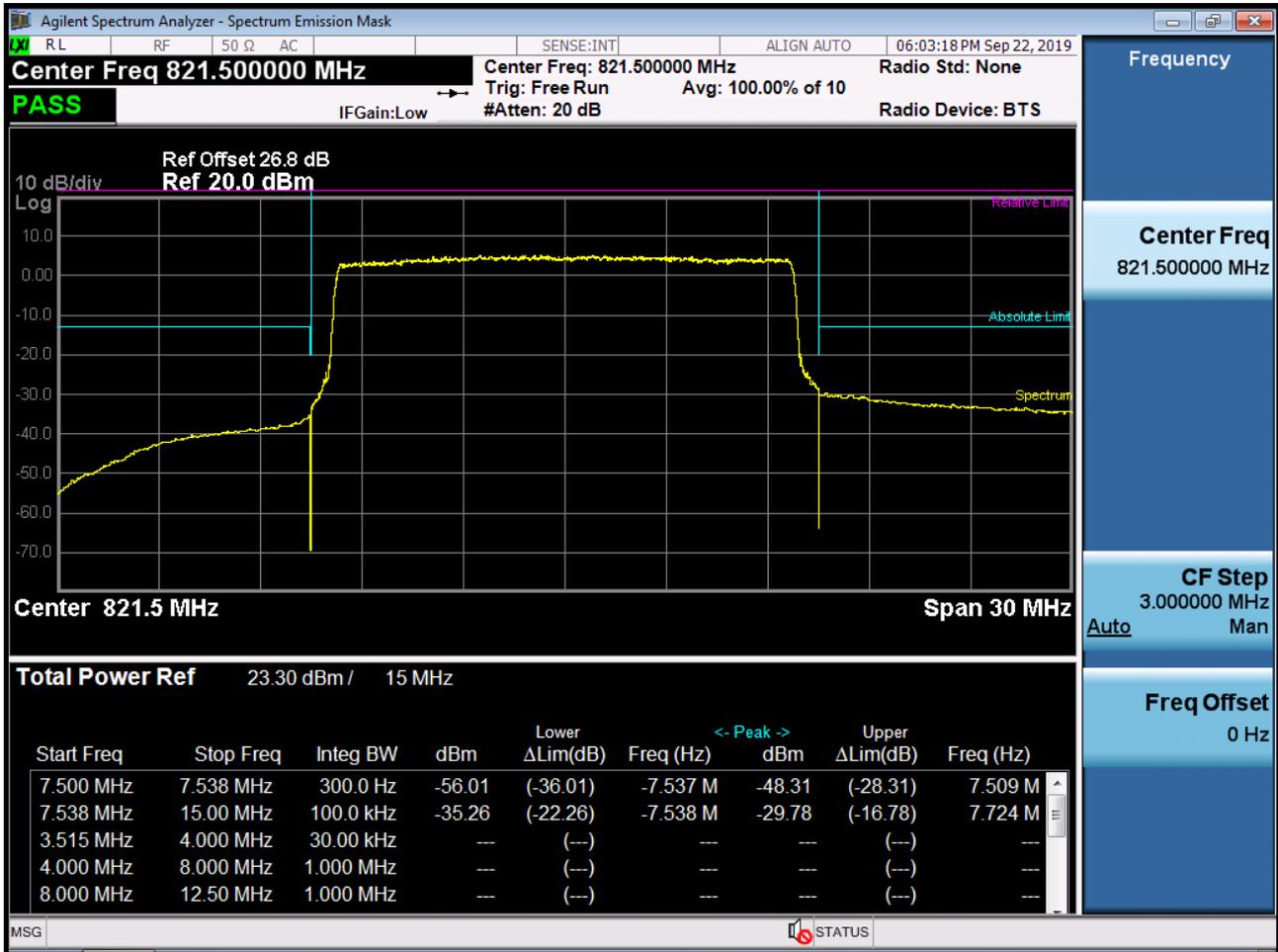
BAND 26. Low Channel Edge Plot (10M BW Ch.26740 QPSK_RB50_Offset 0)



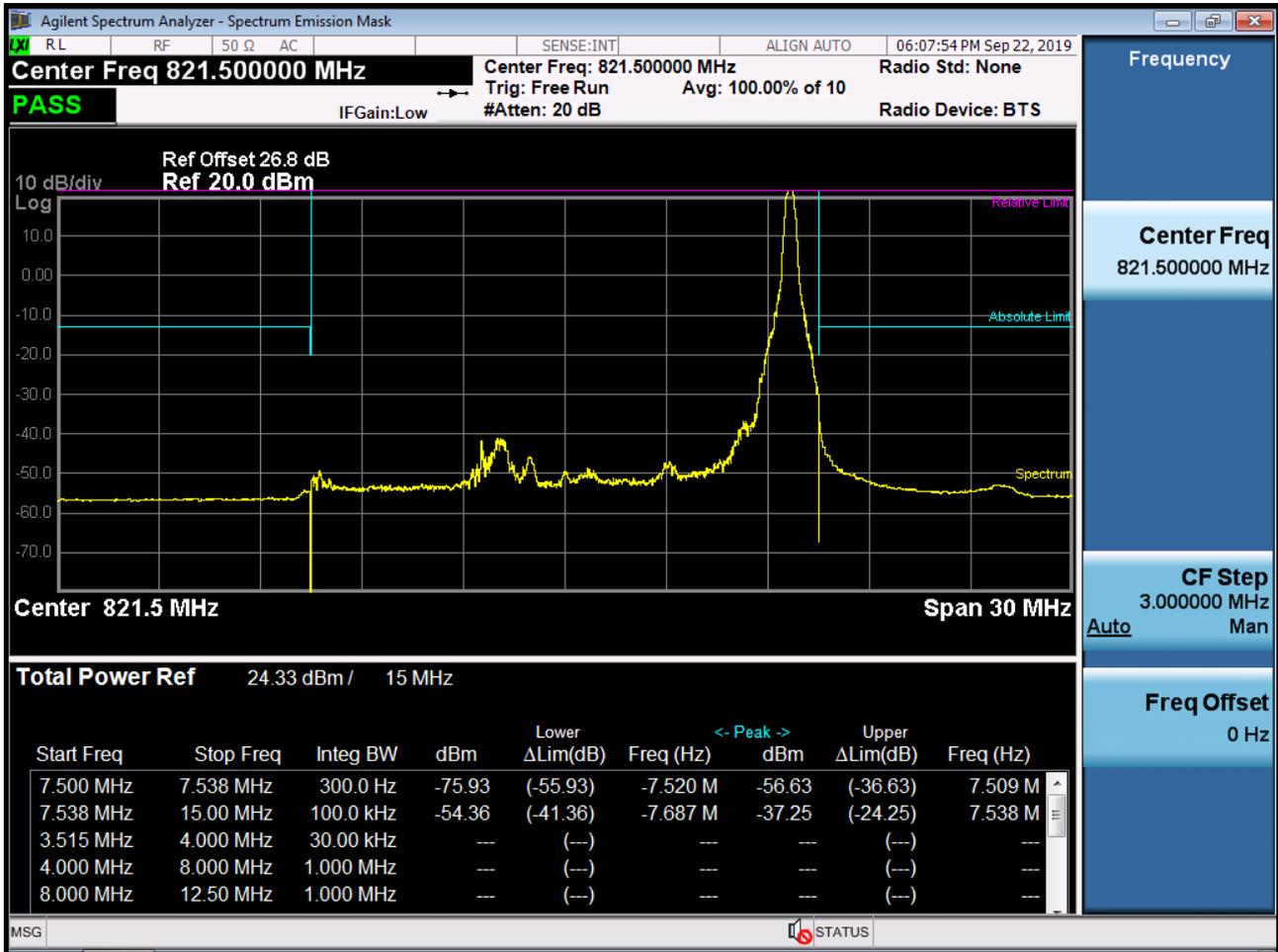
BAND 26. Low Channel Edge Plot (15M BW Ch.26765 QPSK RB 1, Offset 0)



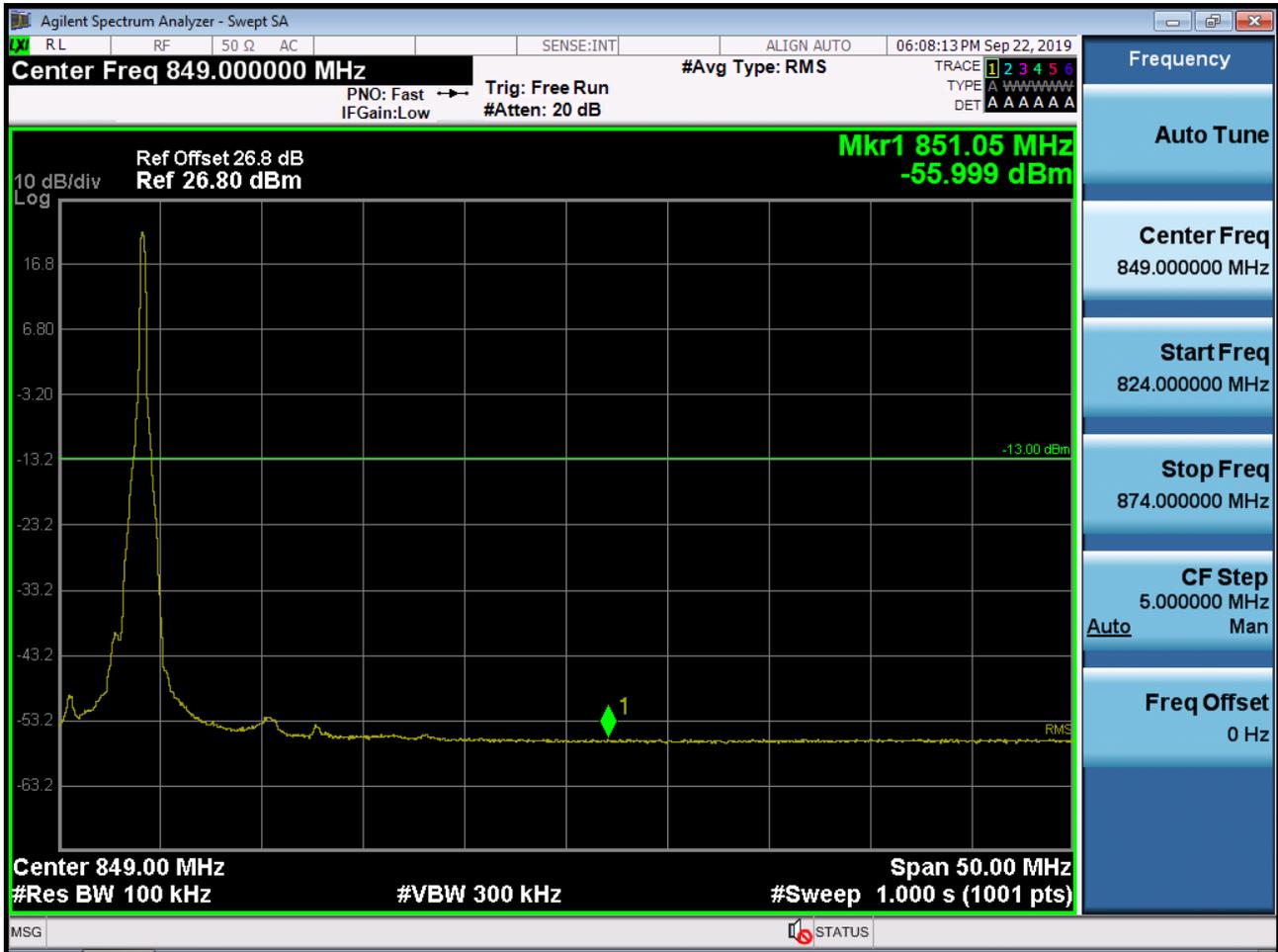
BAND 26. Low Channel Edge Plot (15M BW Ch.26765 QPSK RB 1, Offset74)



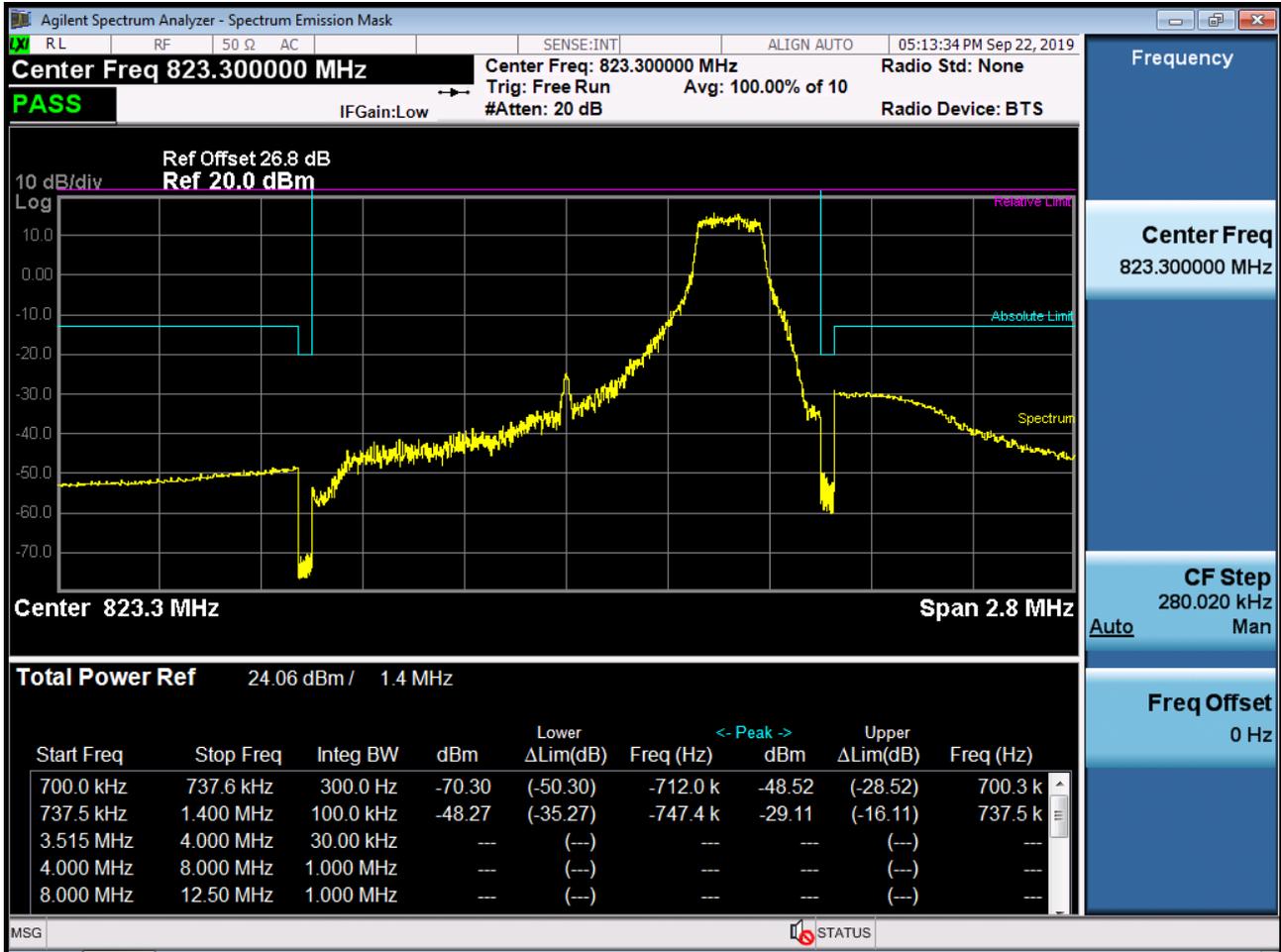
BAND 26. Mid Channel Edge Plot (15M BW Ch.26765 QPSK_RB75_Offset 0)



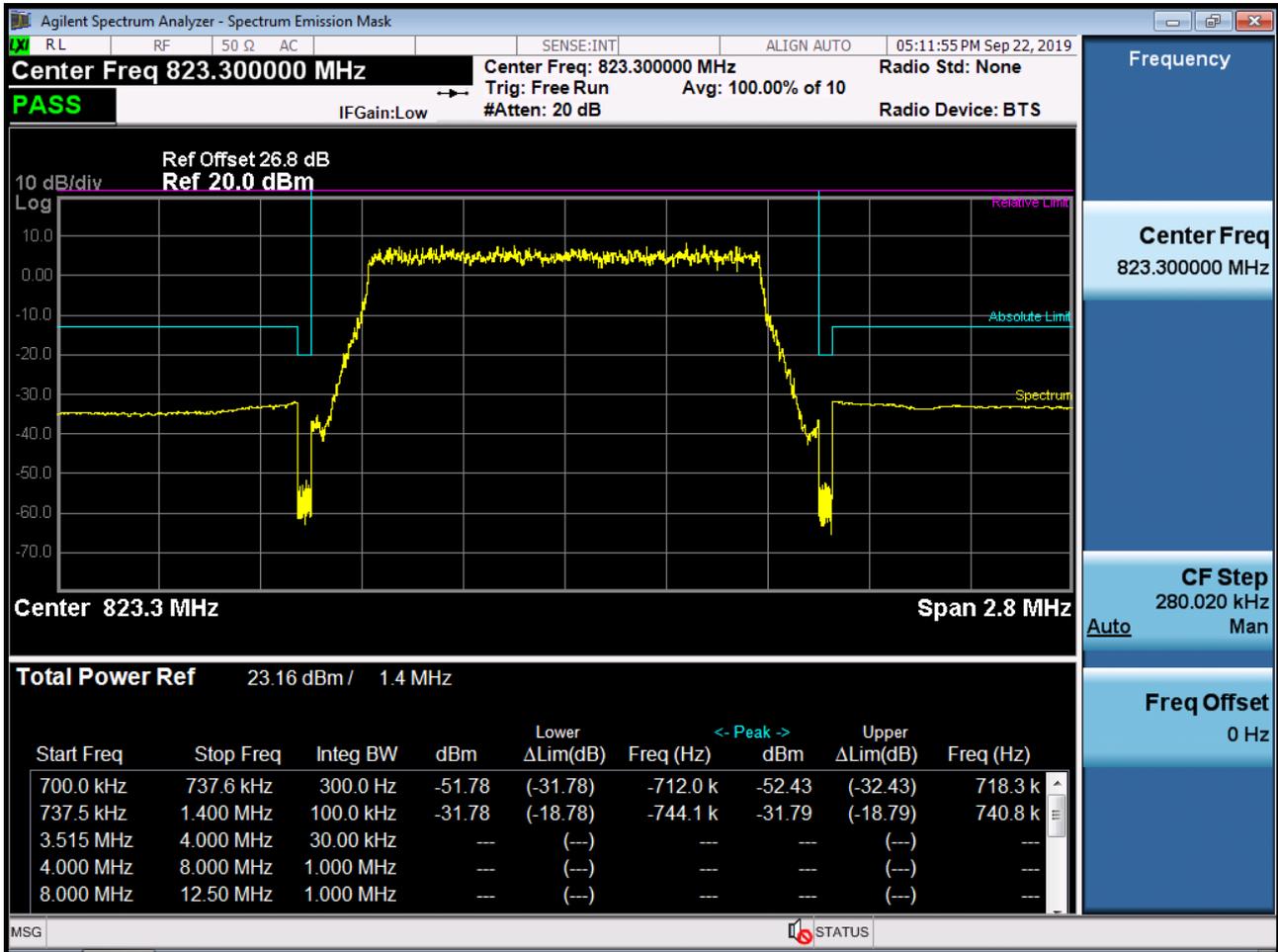
BAND 26. Mid Band Edge Plot (15M BW Ch.26765 QPSK RB 1, Offset74)-1



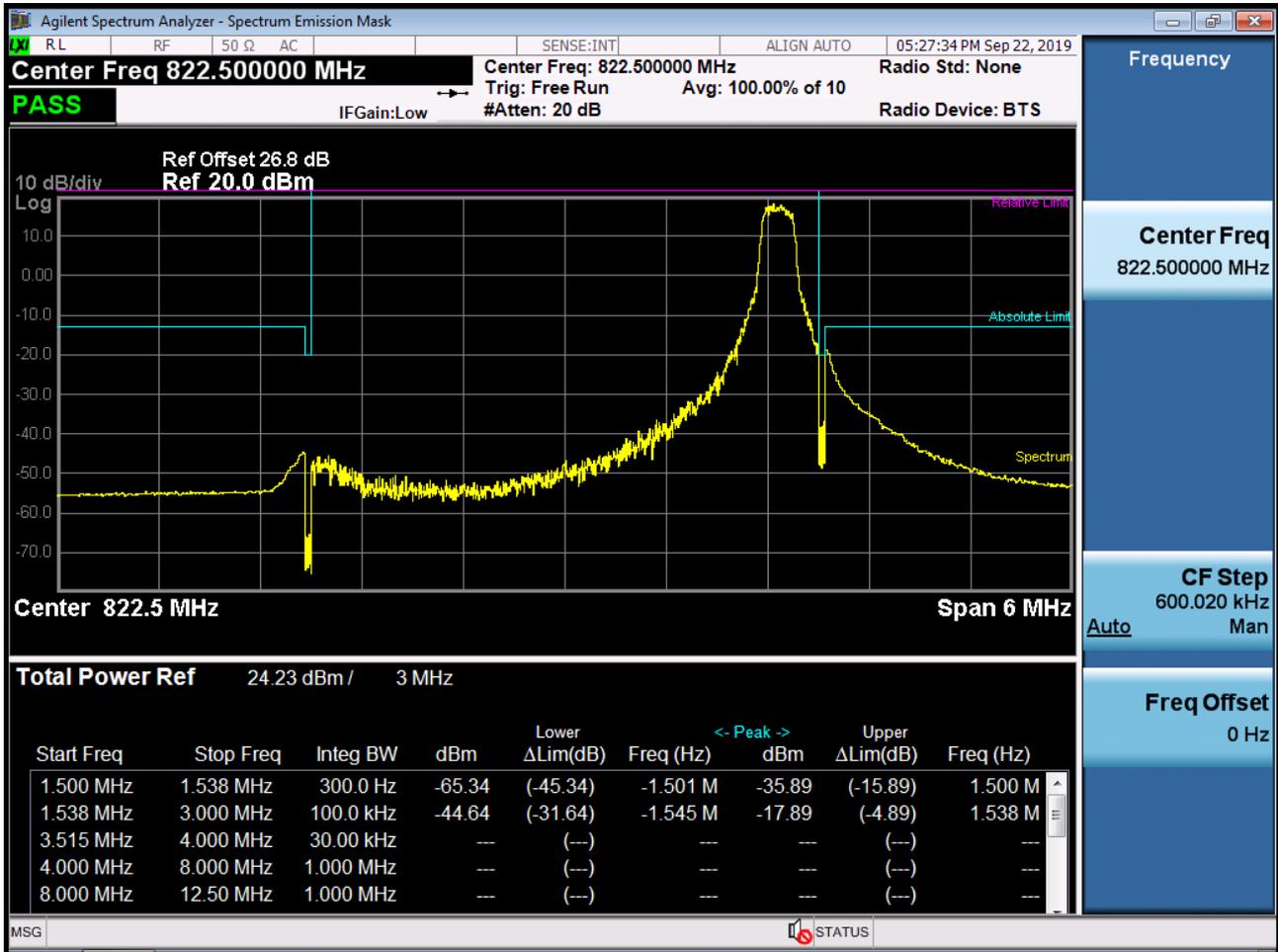
BAND 26. Upper Channel Edge Plot (1.4M BW Ch.26783 QPSK_RB1_Offset 5)



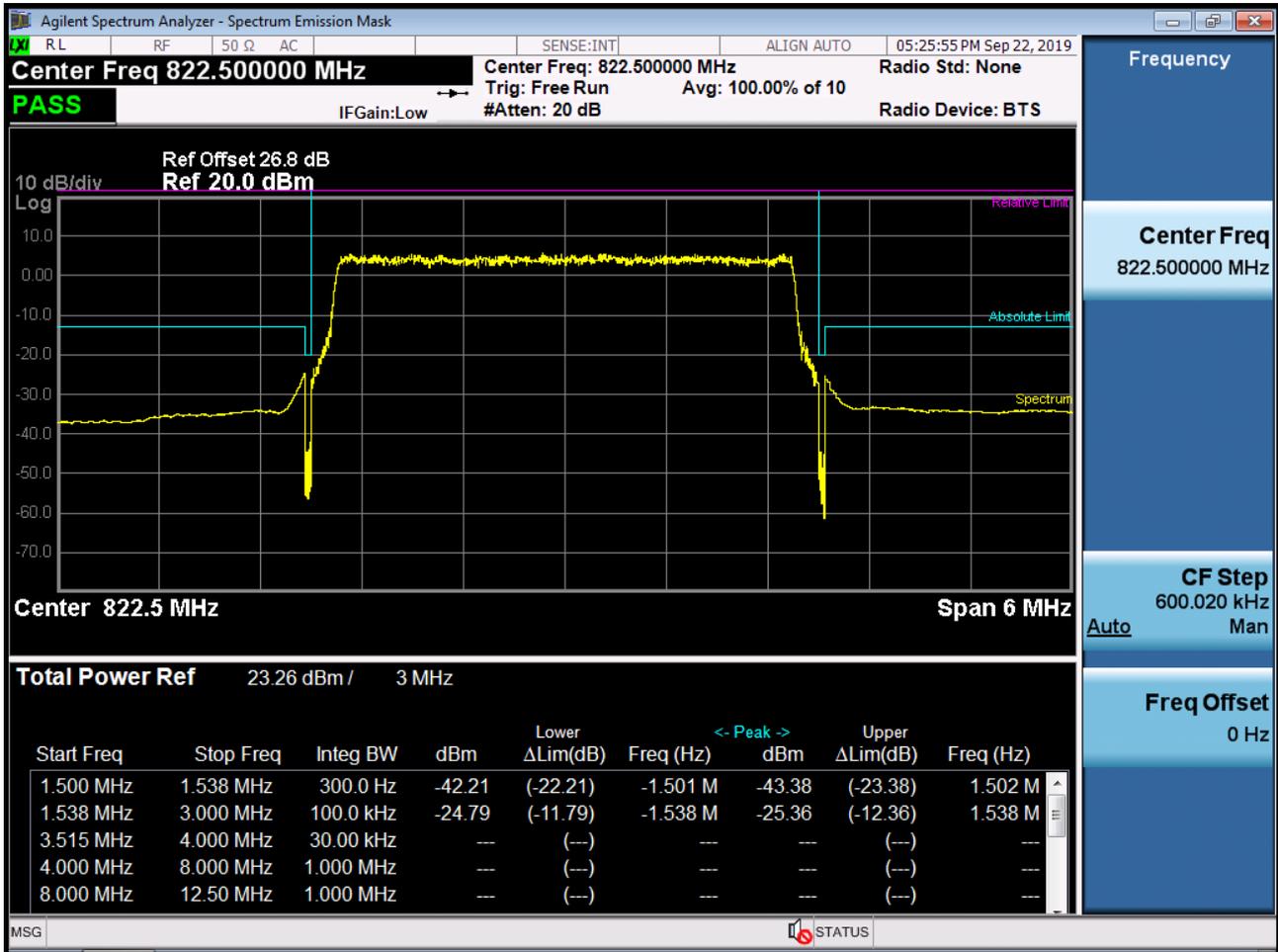
BAND 26. Upper Channel Edge Plot (1.4M BW Ch.26783 QPSK_RB6_Offset 0)



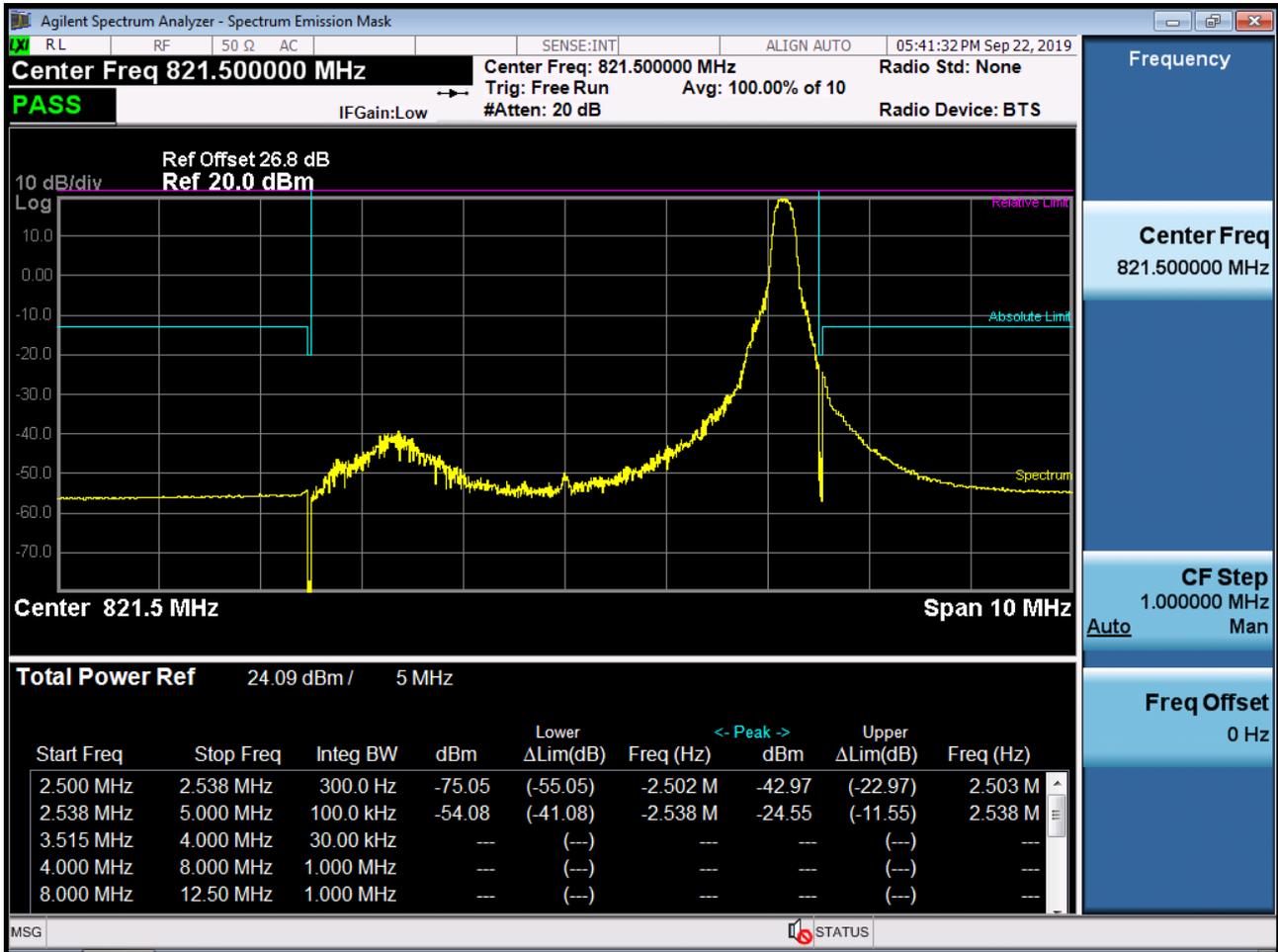
BAND 26. Upper Channel Edge Plot (3M BW Ch.26775 QPSK_RB1_Offset 14)



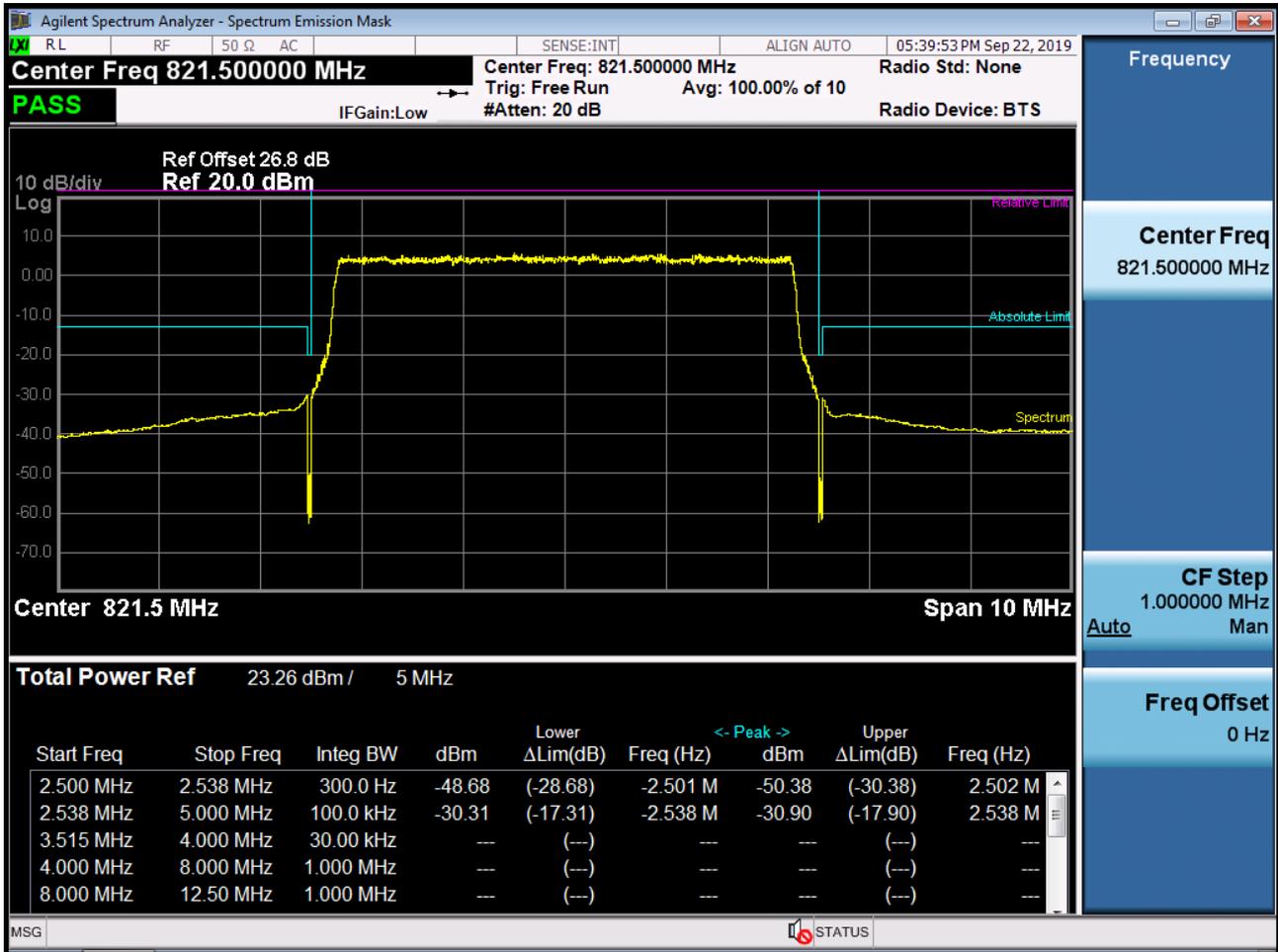
BAND 26. Upper Channel Edge Plot (3M BW Ch.26775 QPSK_RB15_Offset 0)



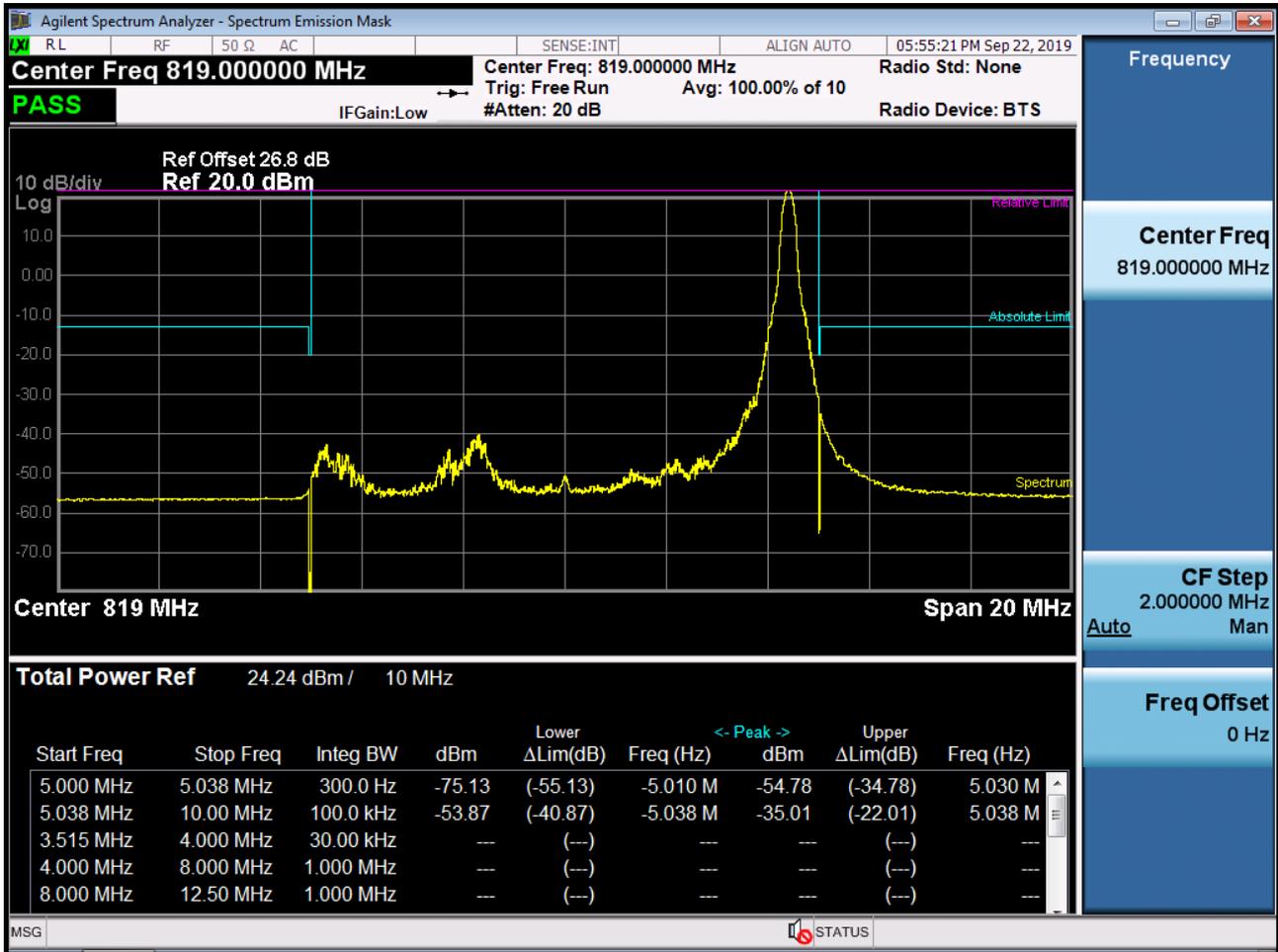
BAND 26. Upper Channel Edge Plot (5M BW Ch.26765 QPSK_RB1_Offset 24)



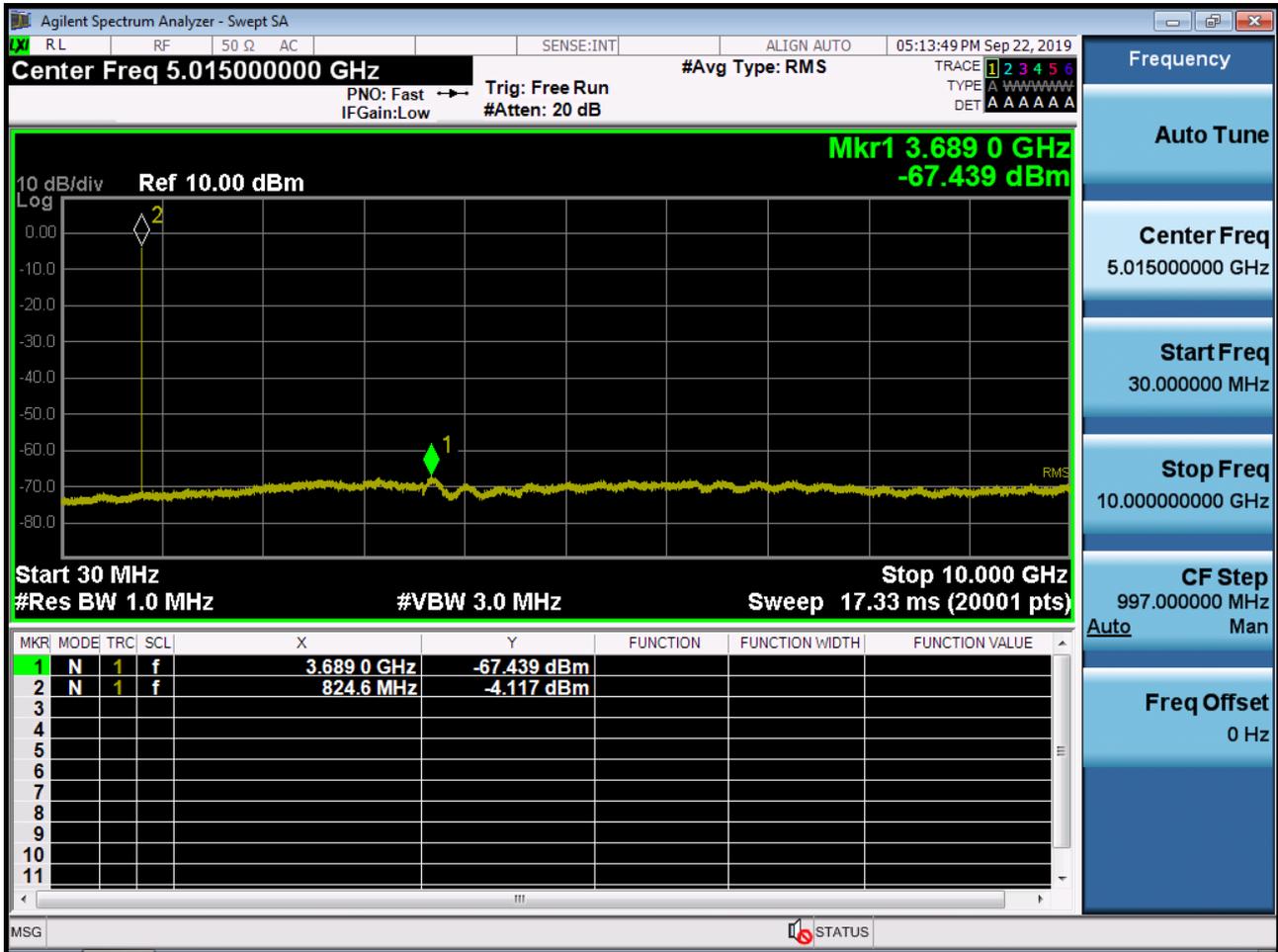
BAND 26. Upper Channel Edge Plot (5M BW Ch.26765 QPSK_RB25_Offset 0)



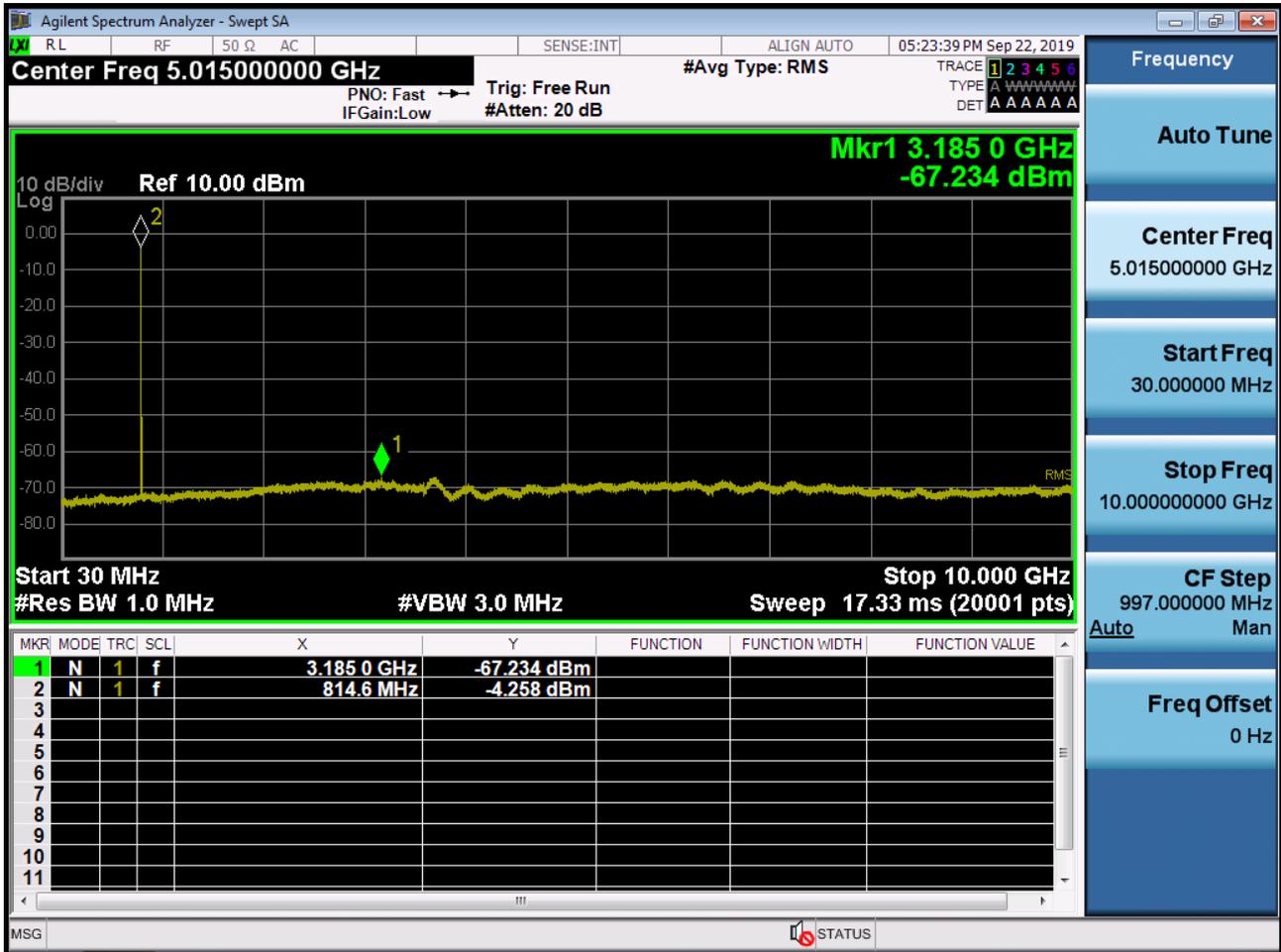
BAND 26. Mid Channel Edge Plot (10M BW Ch. 26740 QPSK_RB1_Offset 49)



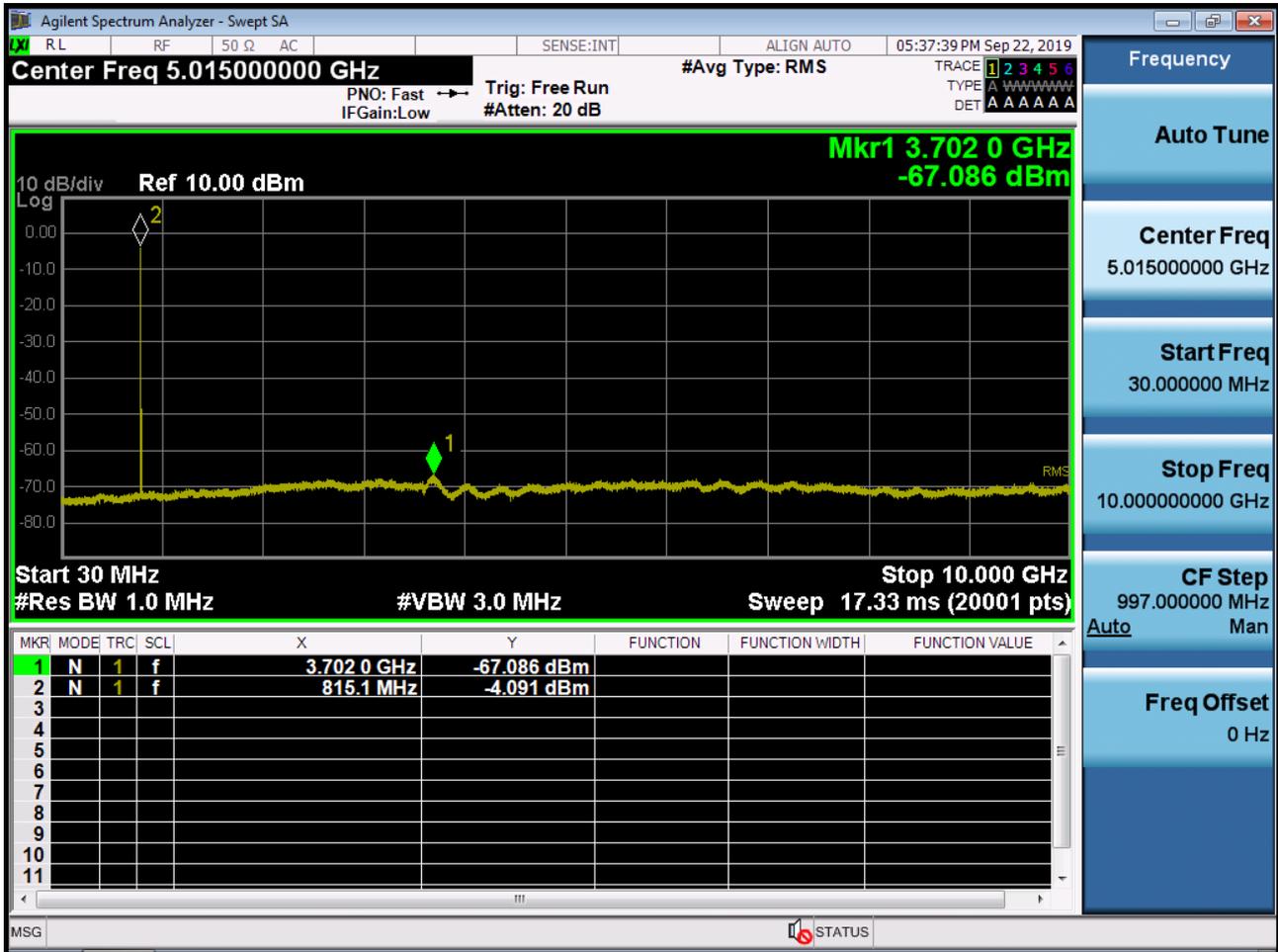
BAND 26. Conducted Spurious (26783 ch_1.4MHz_QPSK_RB 1_0)



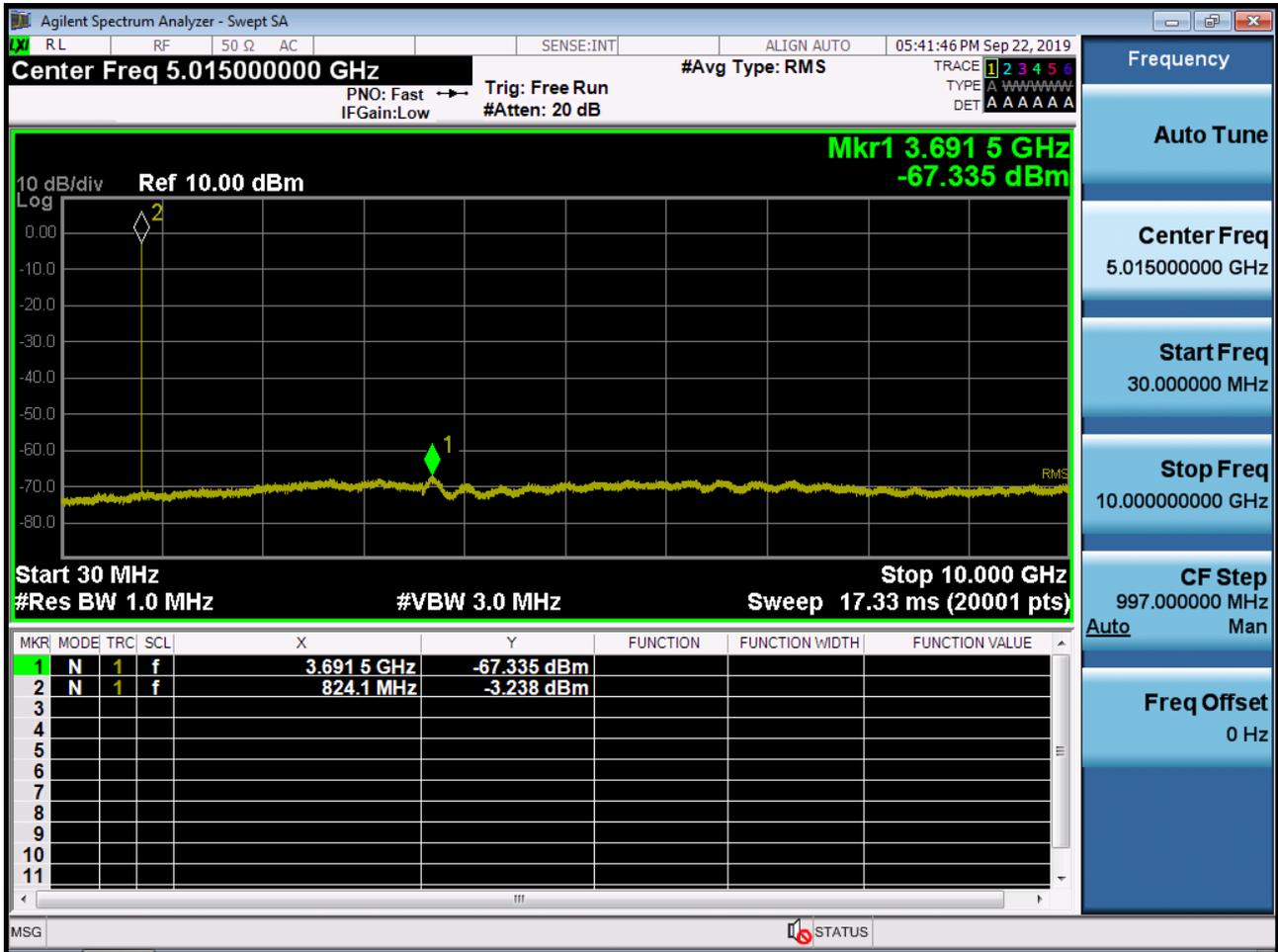
BAND 26. Conducted Spurious (26705 ch_3MHz_QPSK_RB 1_0)



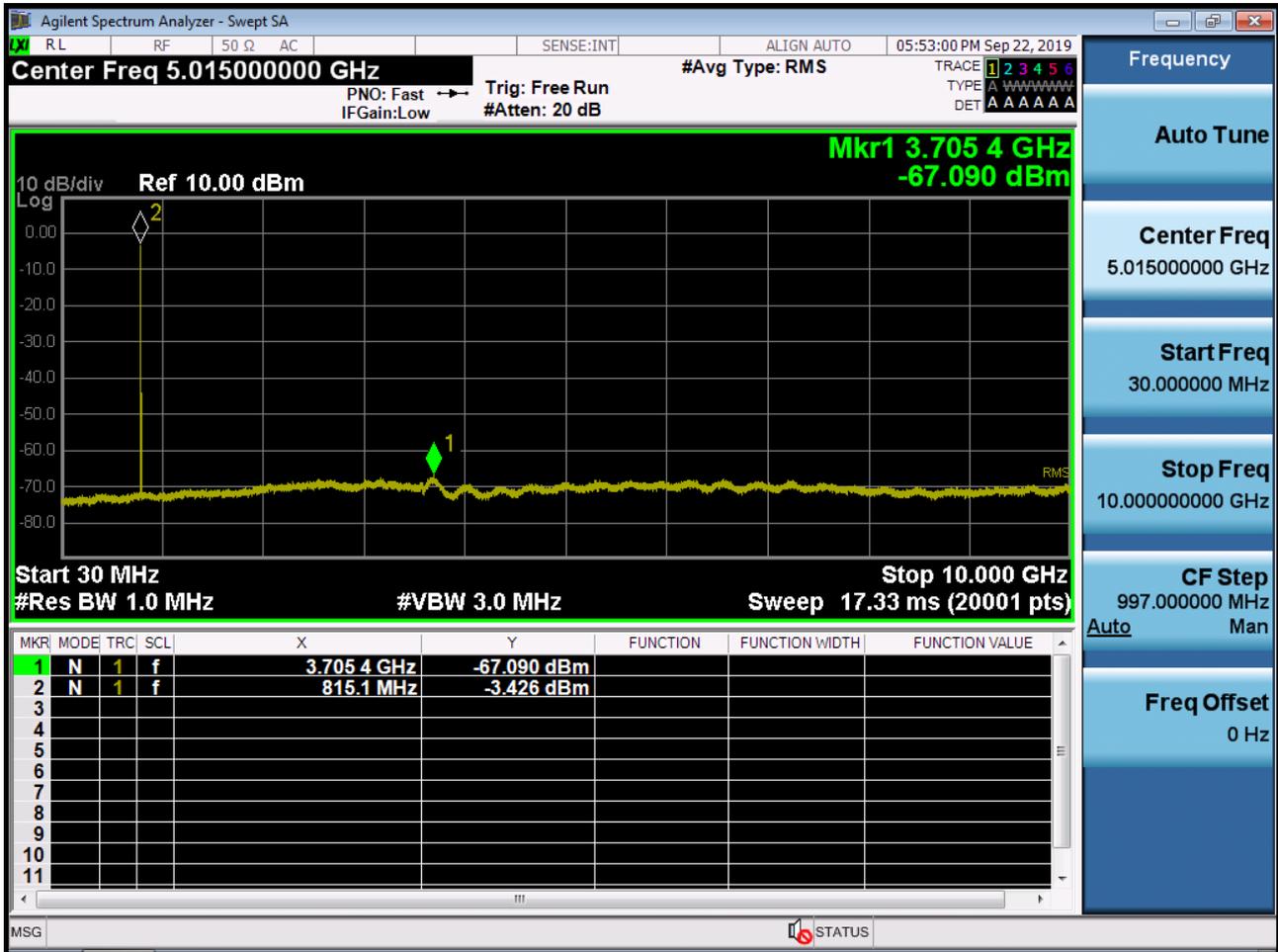
BAND 26. Conducted Spurious (26715 ch_5MHz_QPSK_RB 1_0)



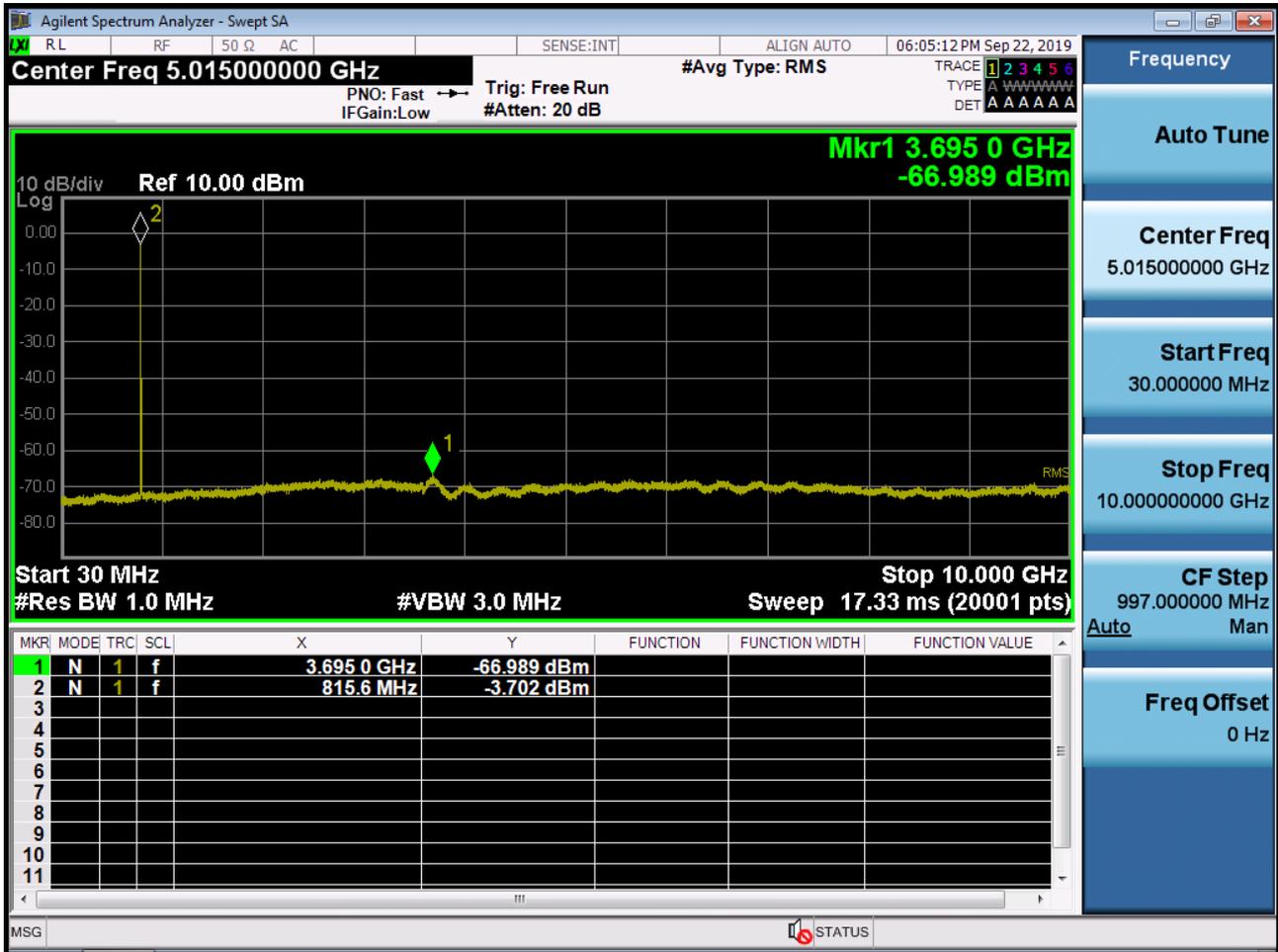
BAND 26. Conducted Spurious (26765 ch_5MHz_QPSK_RB 1_0)



BAND 26. Conducted Spurious (26740 ch_10MHz_QPSK_RB 1_0)

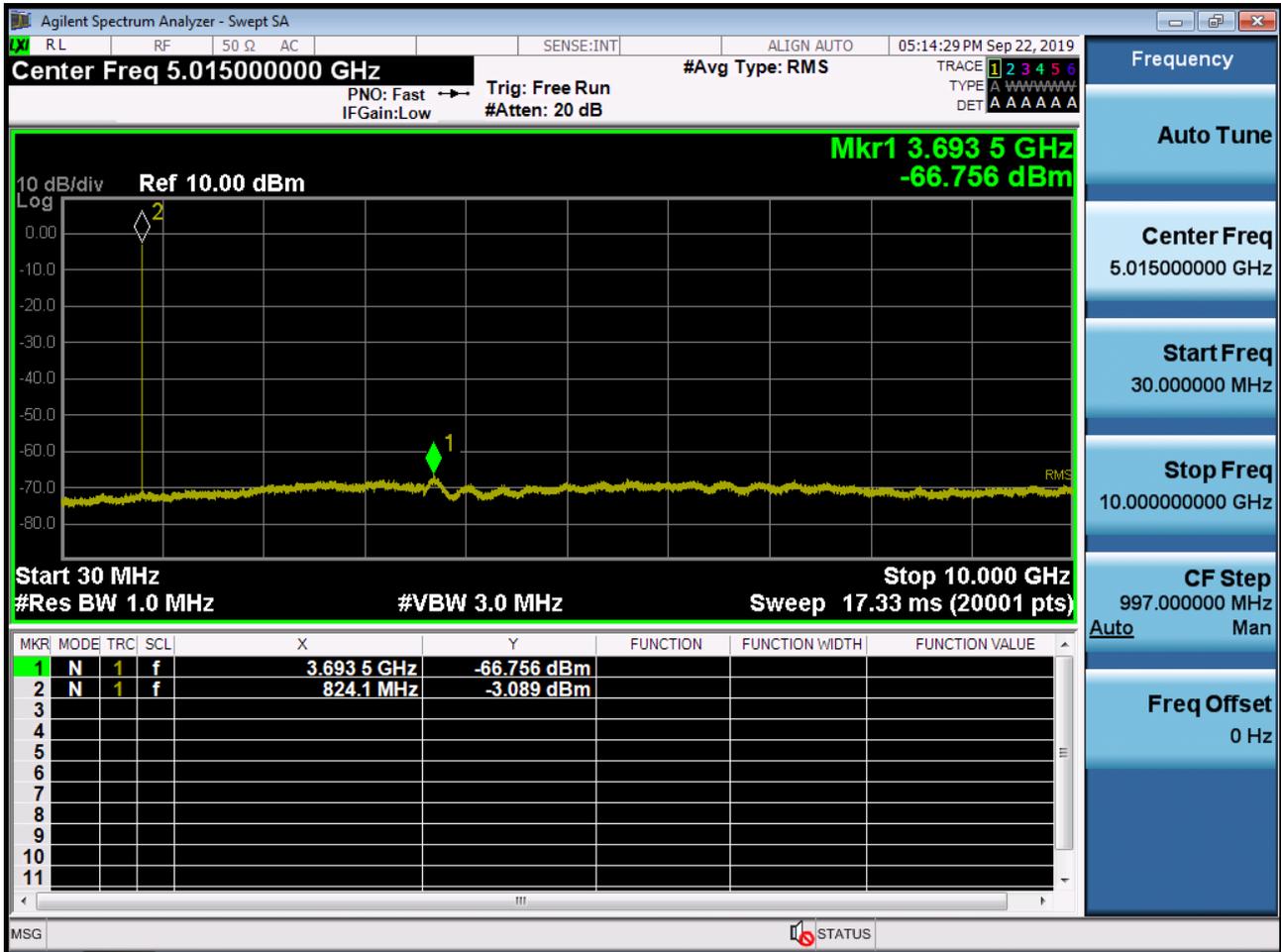


BAND 26. Conducted Spurious (26765 ch_15MHz_QPSK_RB 1_0)

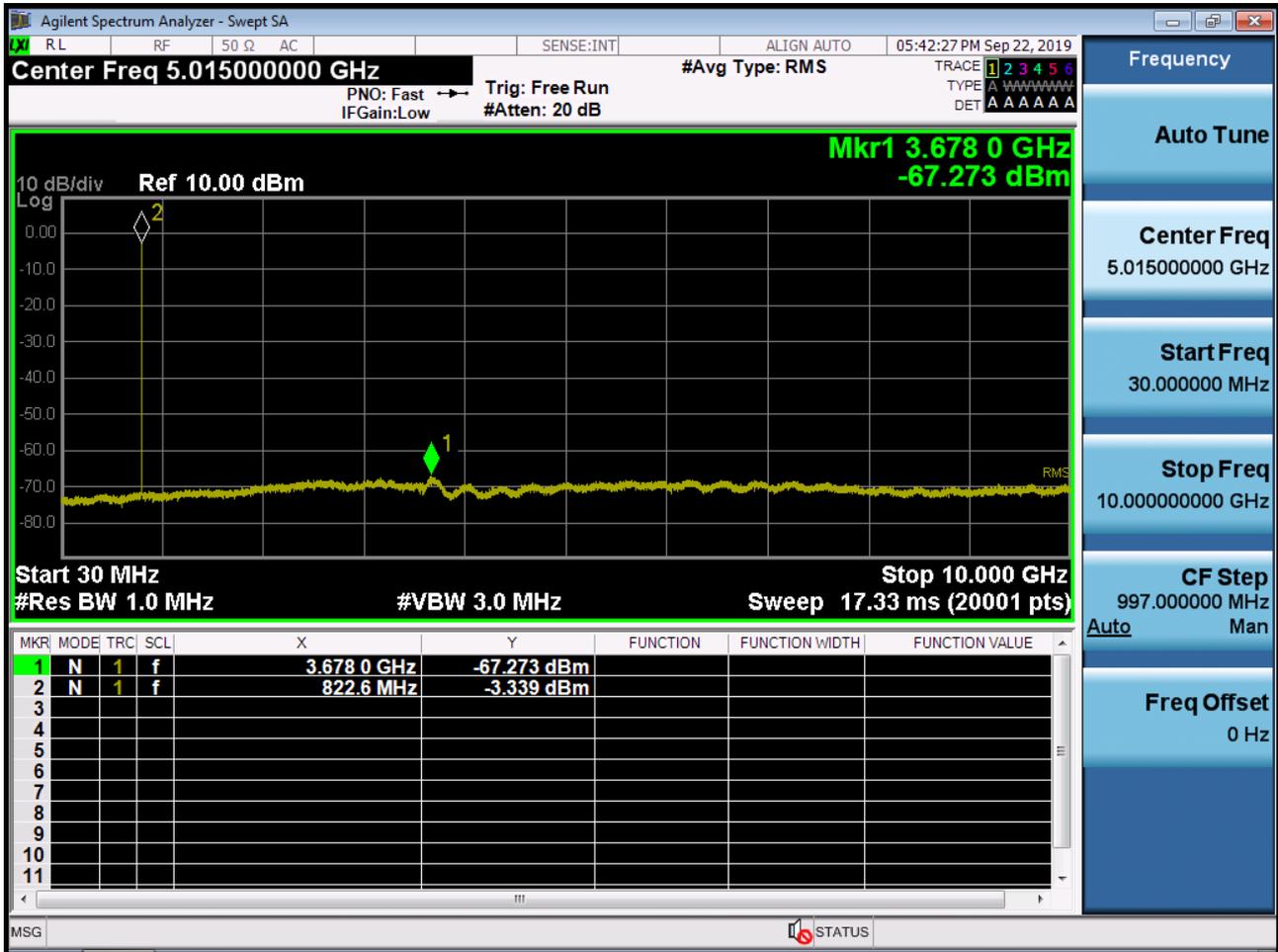


10. TEST PLOTS (STRADDLE CHANNEL)

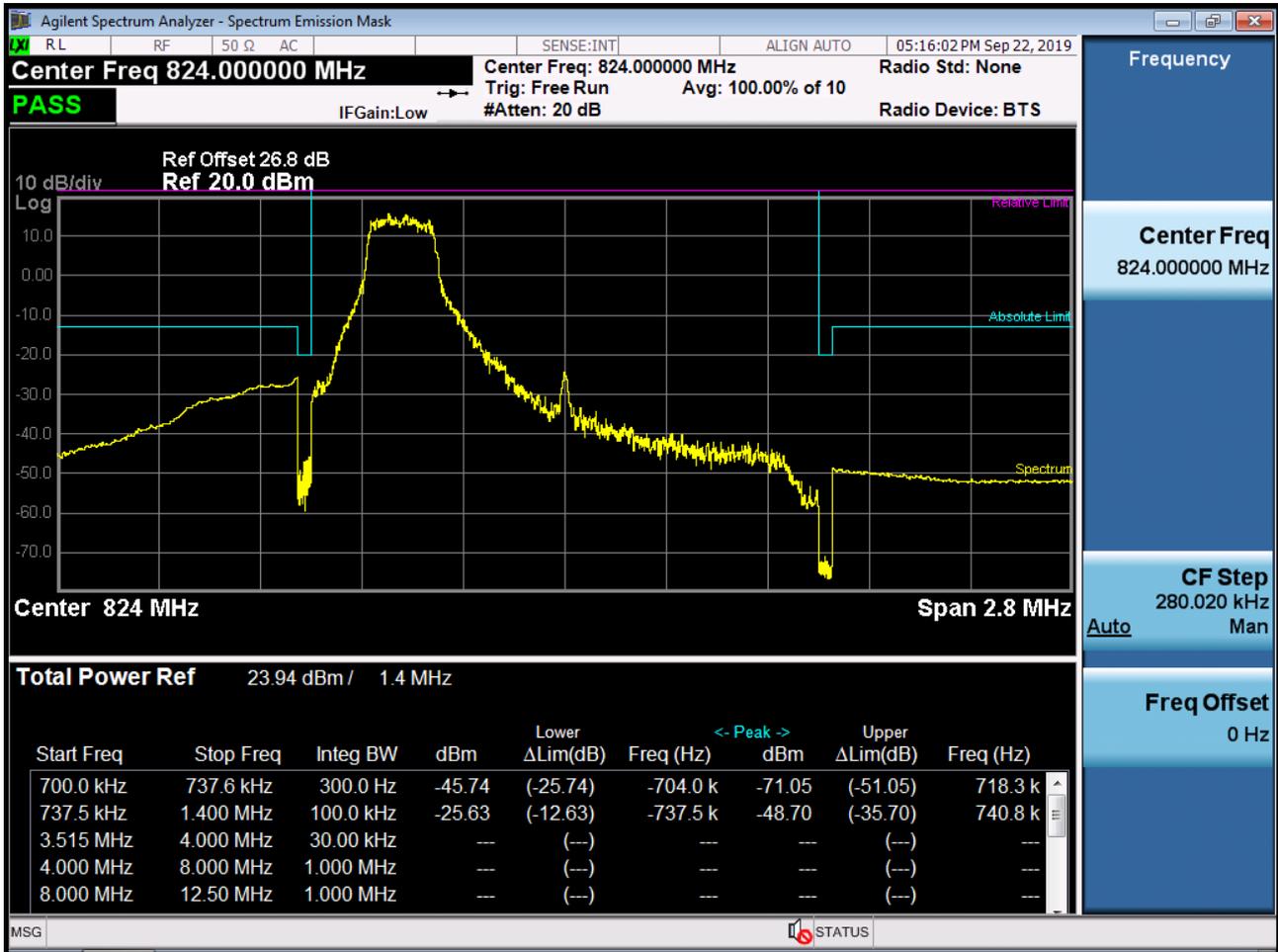
BAND 26. Conducted Spurious (1.4MHz_QPSK_RB 1_0)



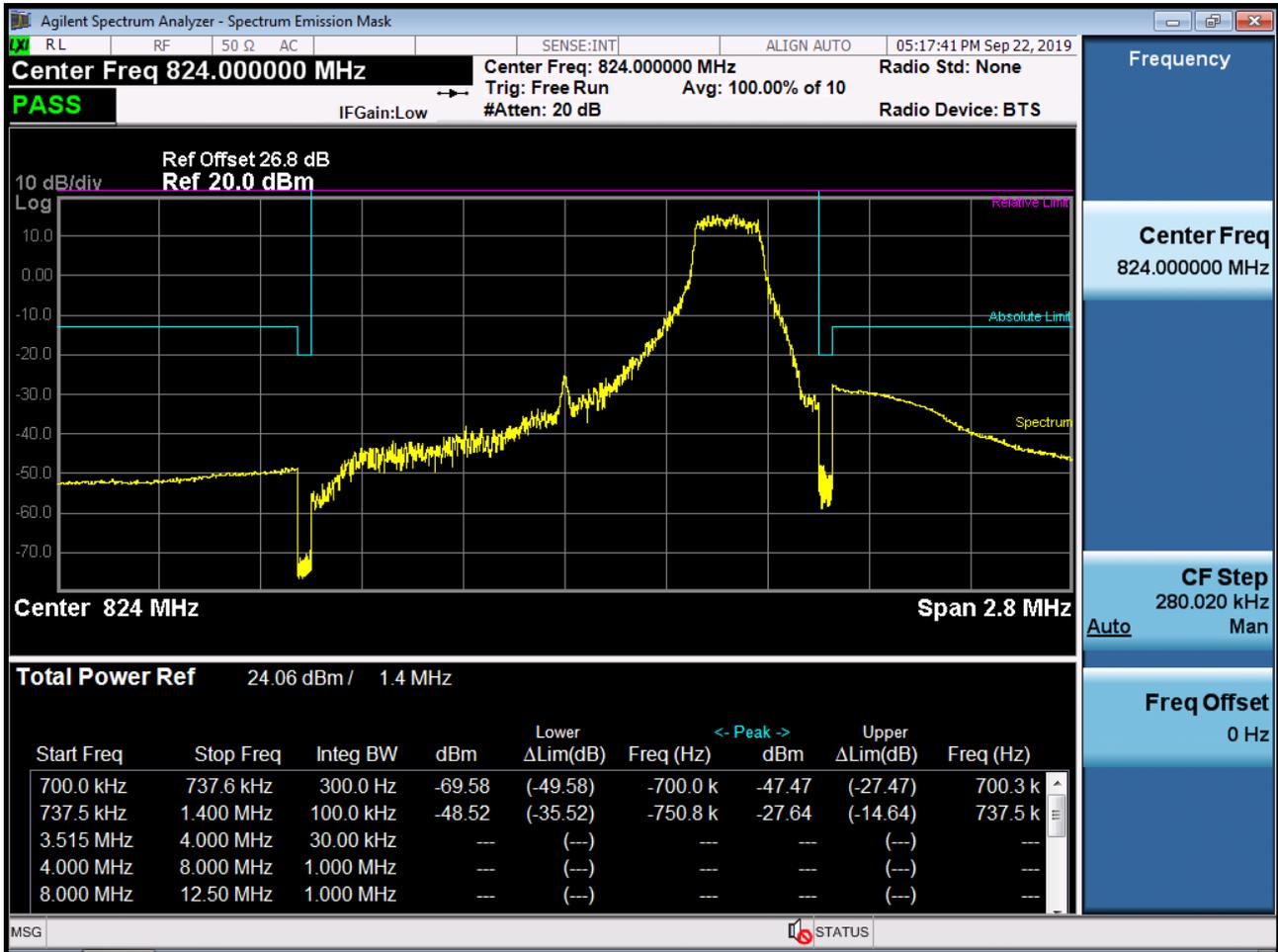
BAND 26. Conducted Spurious (5MHz_QPSK_RB 1_0)



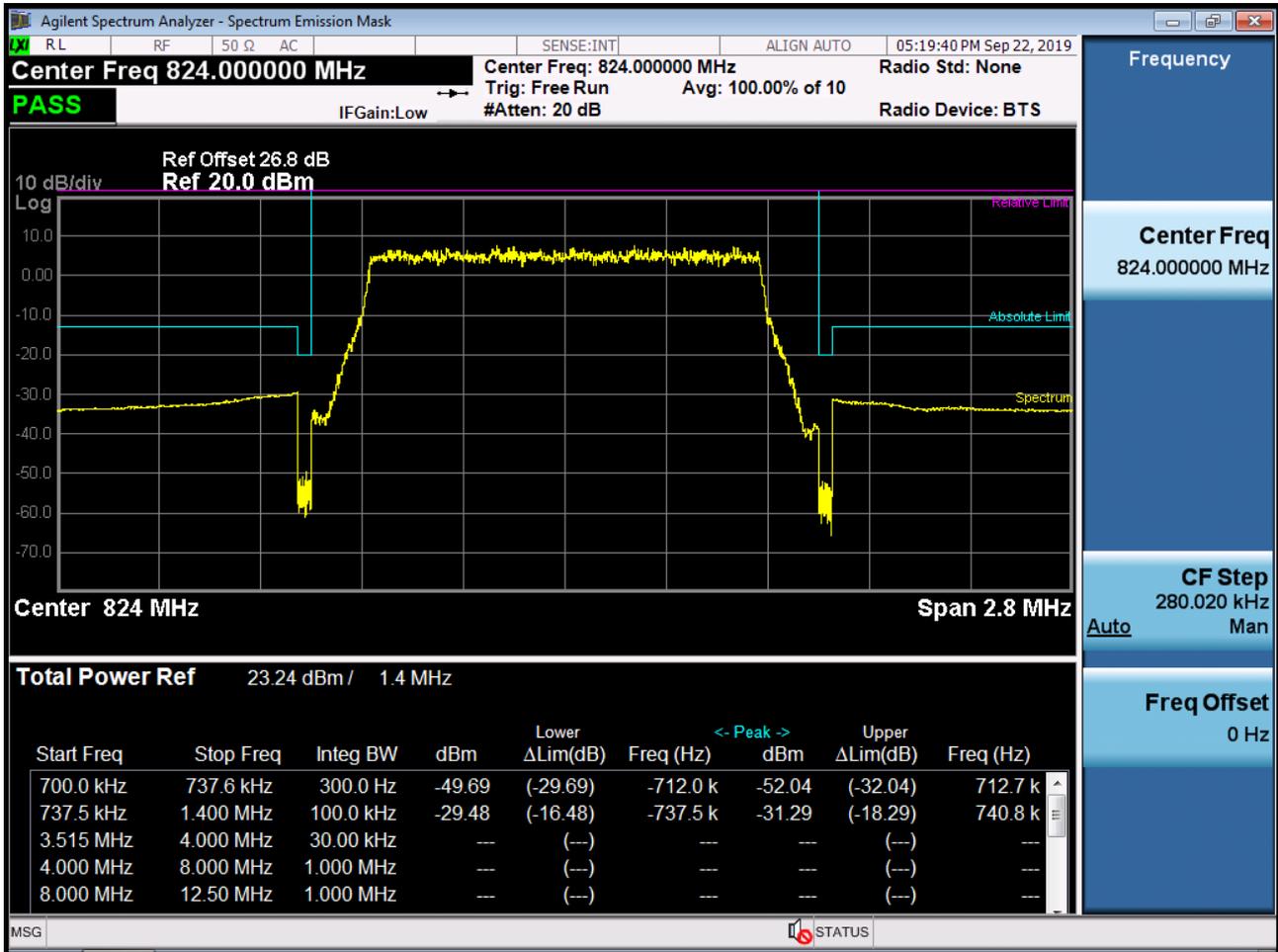
BAND 26. Channel Edge (1.4MHz_QPSK_RB 1_0)



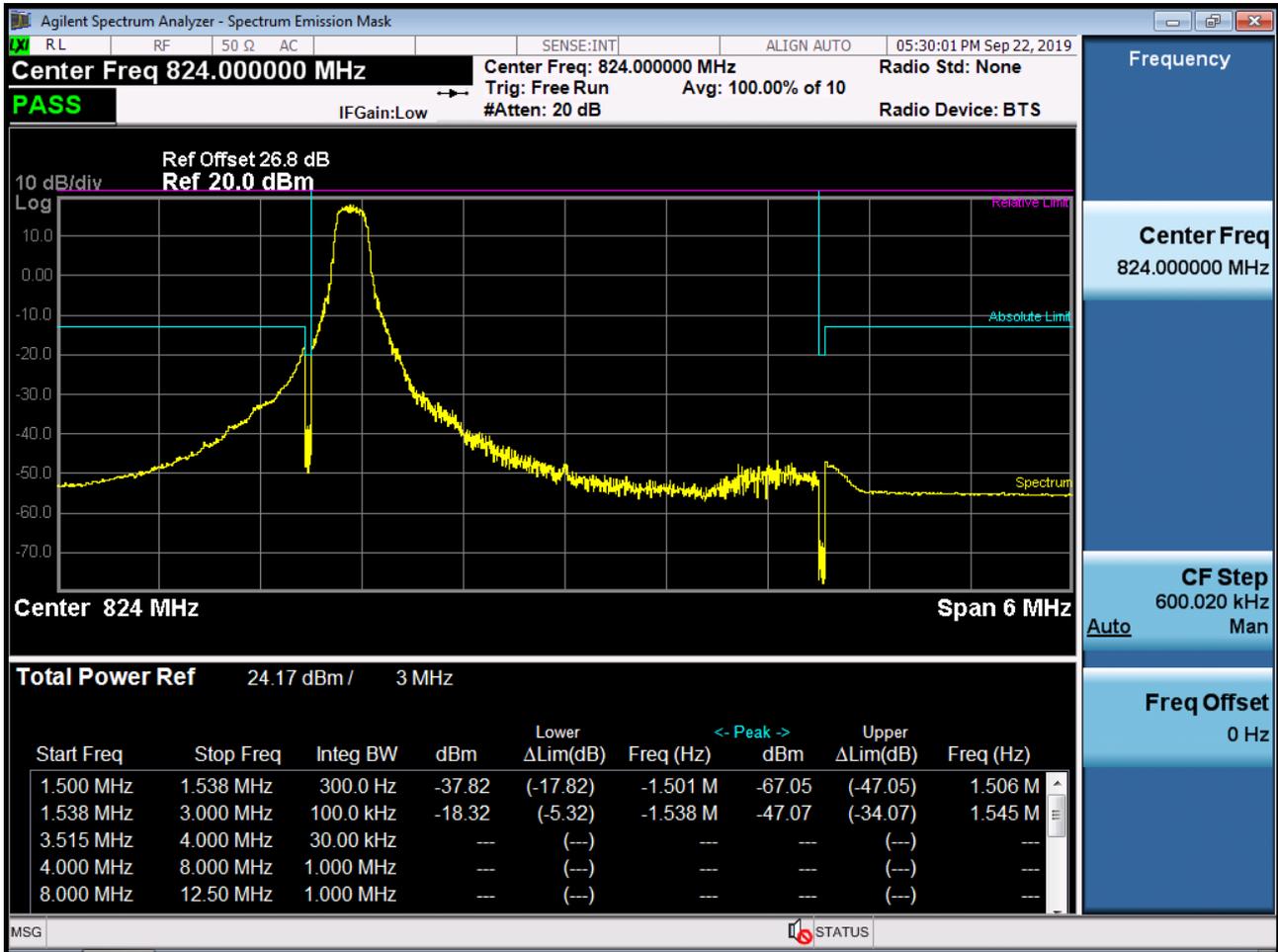
BAND 26. Channel Edge (1.4MHz_QPSK_RB 1_5)



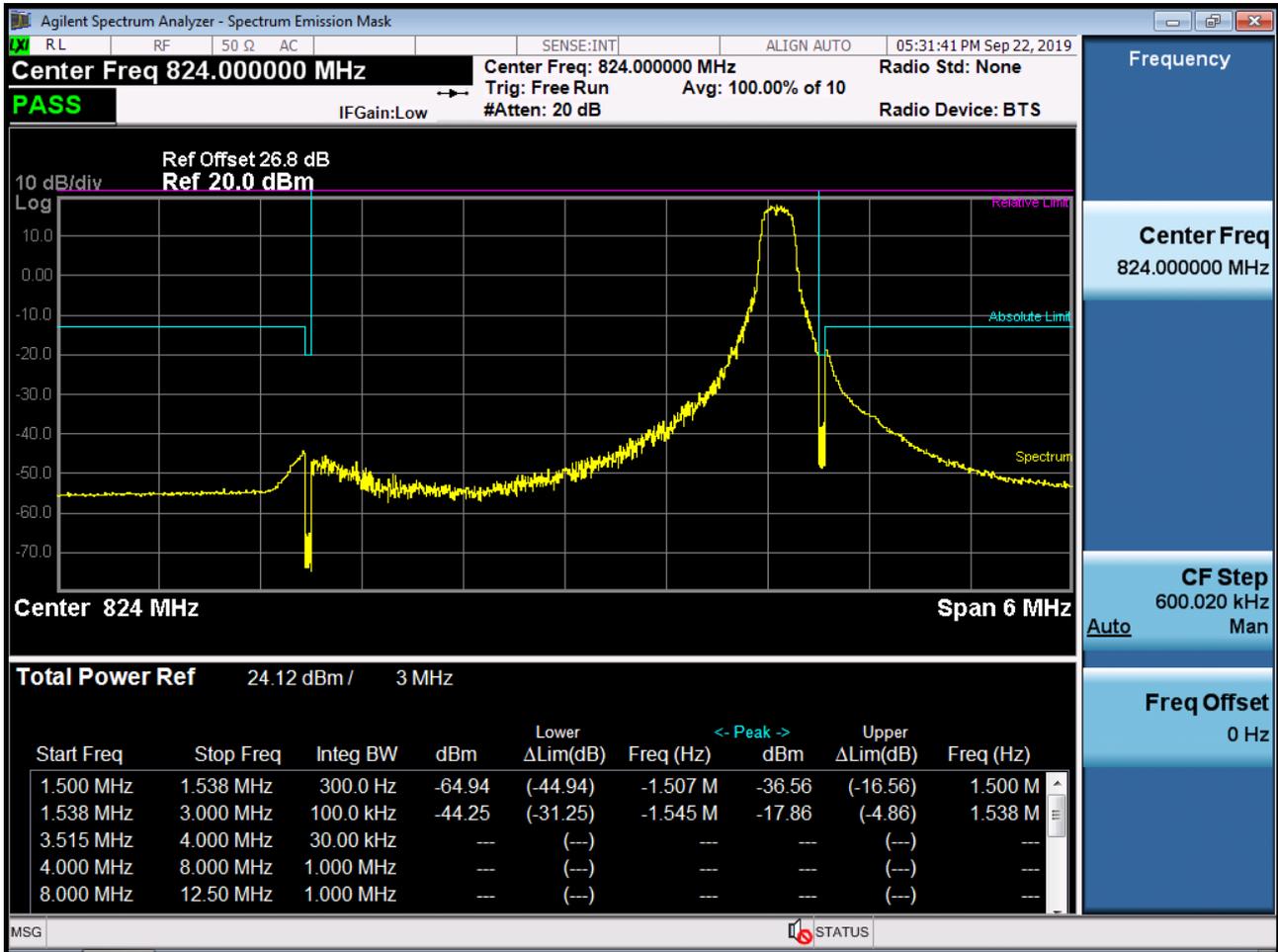
BAND 26. Channel Edge (1.4MHz_QPSK_Full RB)



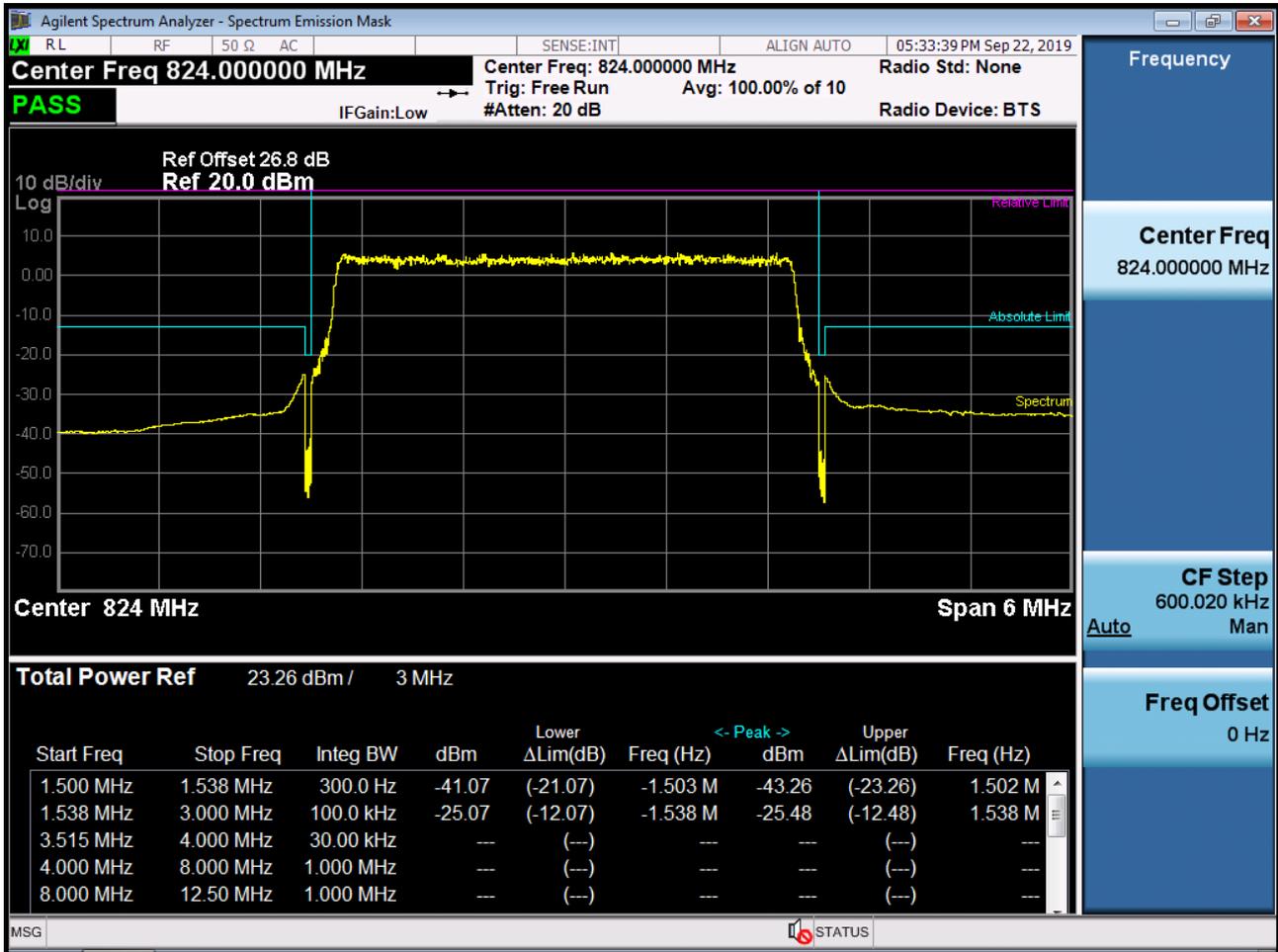
BAND 26. Channel Edge (3MHz_QPSK_RB 1_0)



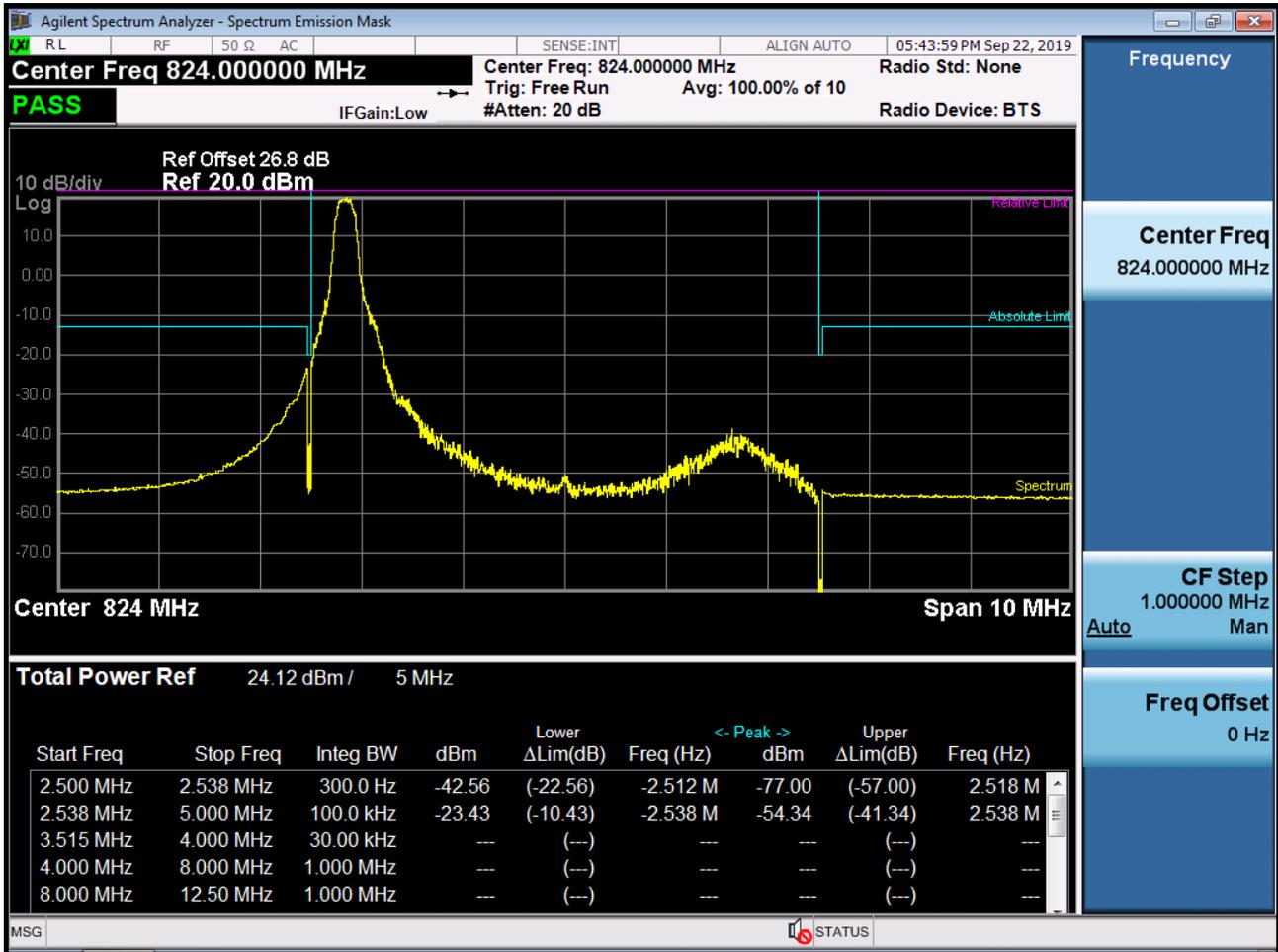
BAND 26. Channel Edge (3MHz_QPSK_RB 1_14)



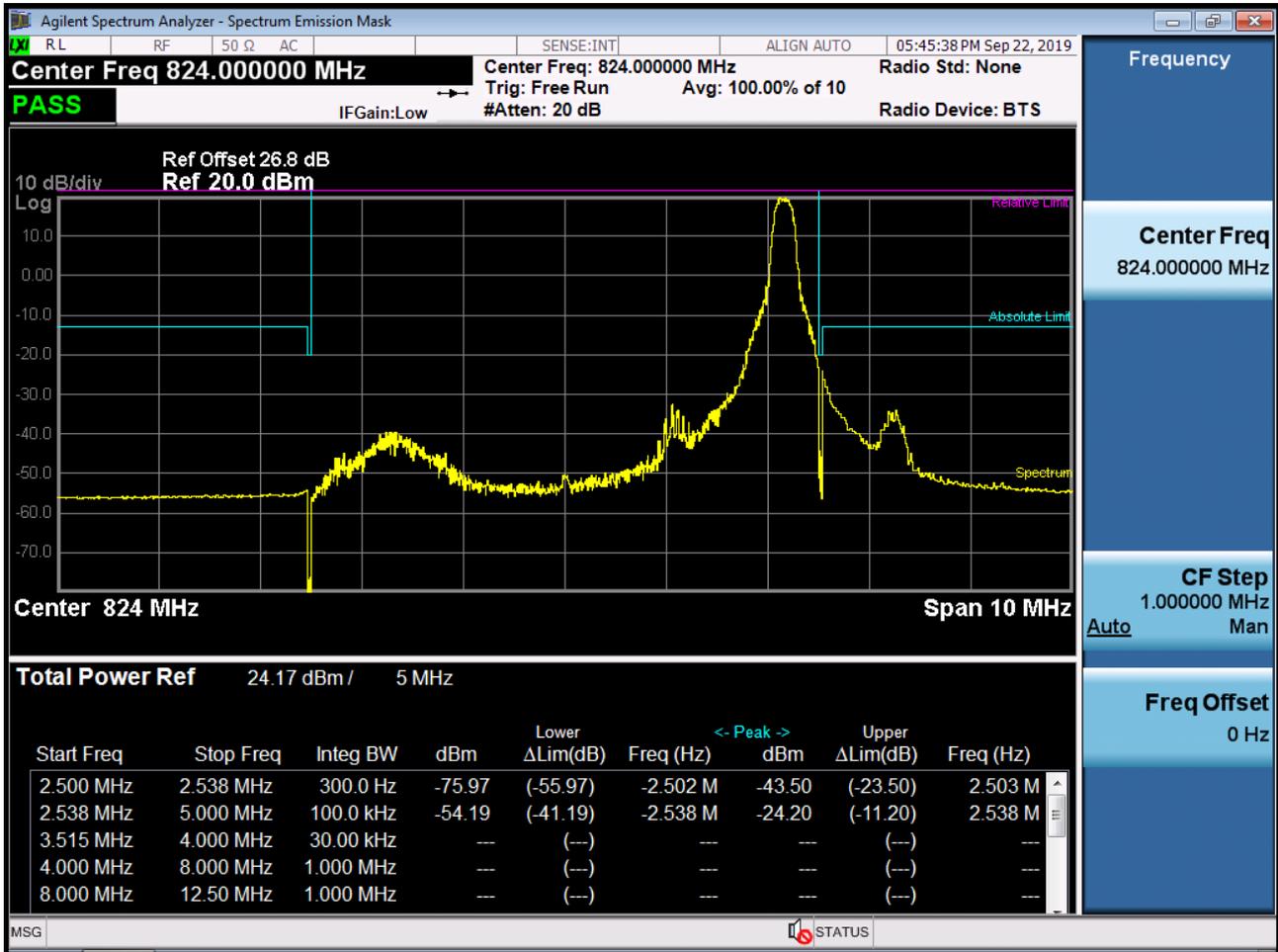
BAND 26. Channel Edge (3MHz_QPSK_Full RB)



BAND 26. Channel Edge (5MHz_QPSK_RB 1_0)



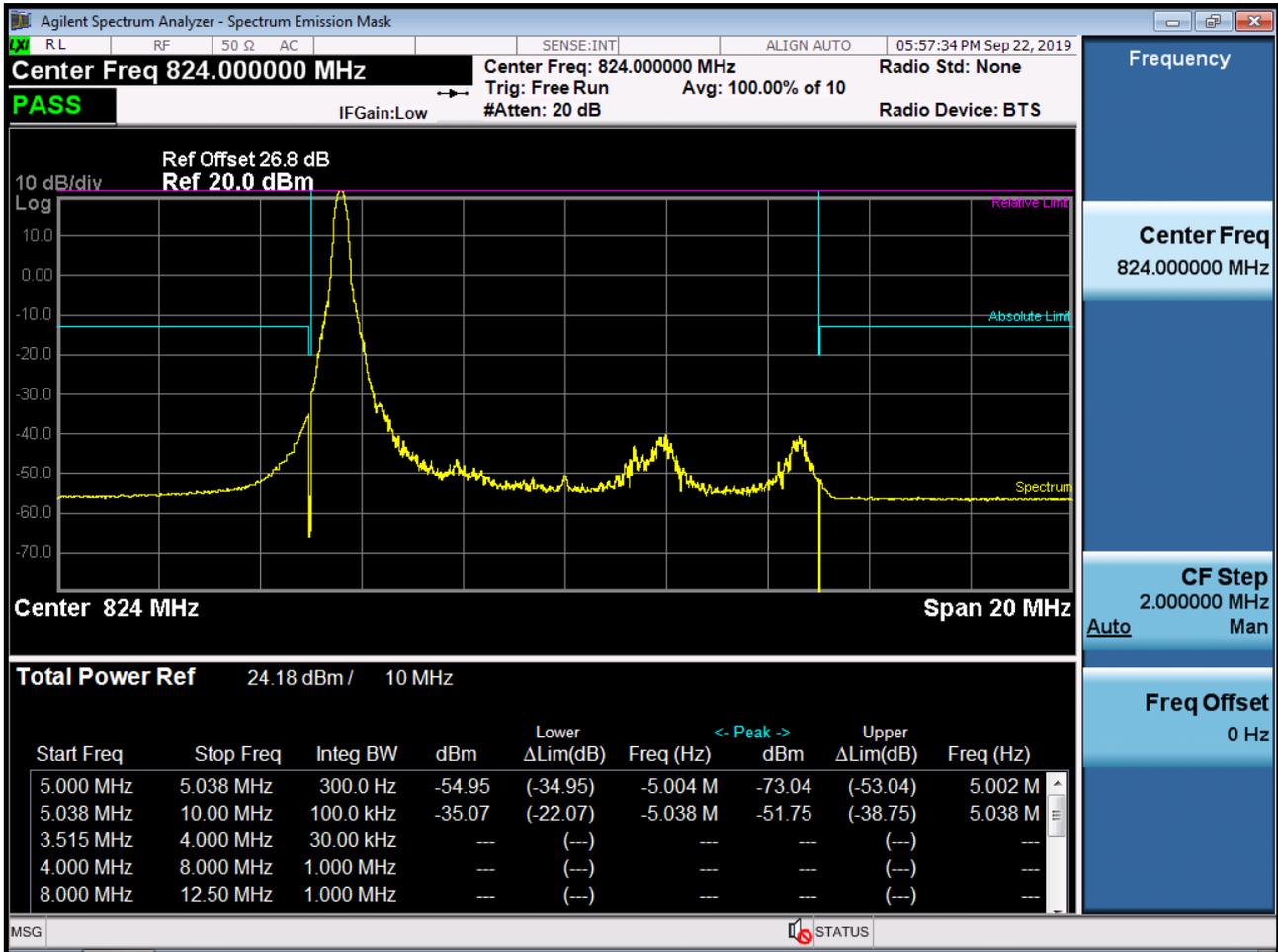
BAND 26. Channel Edge (5MHz_QPSK_RB 1_24)



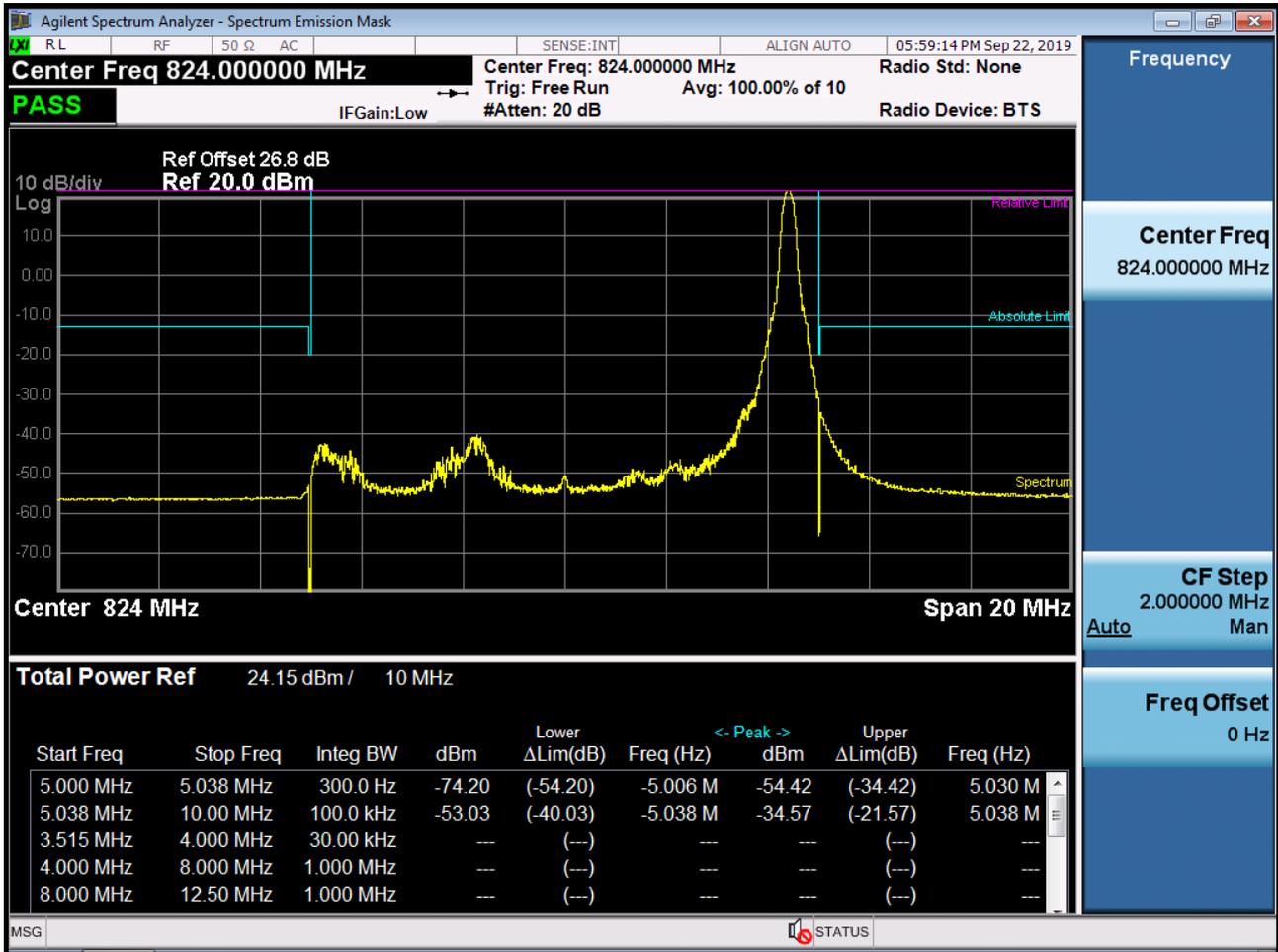
BAND 26. Channel Edge (5MHz_QPSK_Full RB)



BAND 26. Channel Edge (10MHz_QPSK_RB 1_0)



BAND 26. Channel Edge (10MHz_QPSK_RB 1_49)



BAND 26. Channel Edge (10MHz_QPSK_Full RB)



BAND 26. Band Edge (1.4MHz_QPSK_RB 1_5)



BAND 26. Band Edge (3MHz_QPSK_RB 1_14)



BAND 26. Band Edge (3MHz_QPSK_ Full RB)



BAND 26. Band Edge (5MHz_QPSK_Full RB)



BAND 26. Band Edge (10MHz_QPSK_RB 1_49)



BAND 26. Band Edge (10MHz_QPSK_ Full RB)



11 ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1909-FC021-P